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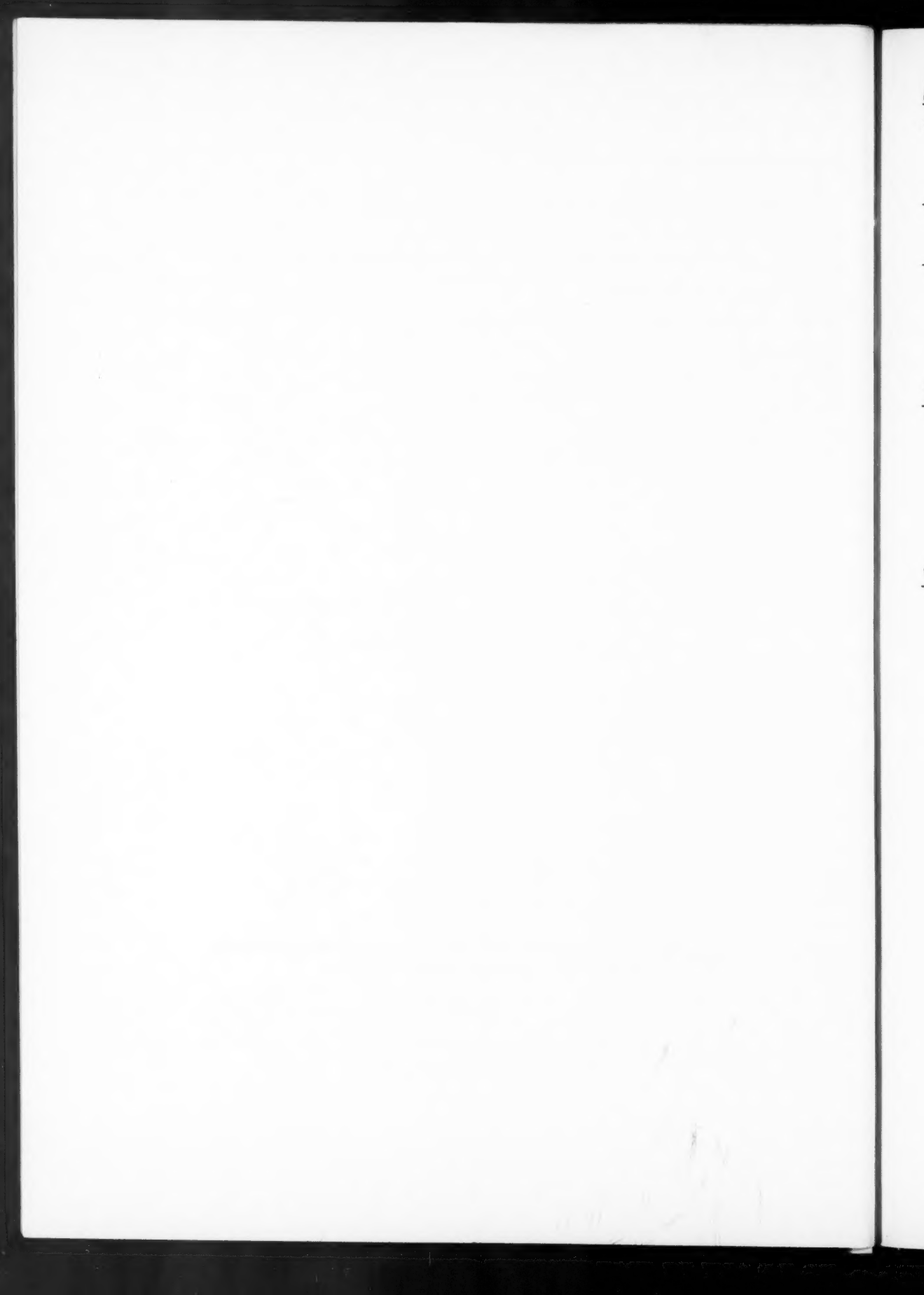
April 1966

A journal of
selected excerpts, summaries and
reprints of current materials on
economic and social development

Prepared by the NATIONAL PLANNING ASSOCIATION
William I. Jones, DIGEST Editor

for

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CONTENTS

TAKING STOCK OF DEVELOPMENT AND PLANNING

A REVIEW OF ECONOMIC DEVELOPMENT 1
W. Arthur Lewis

A REVIEW OF PLANNING 14
Albert Waterston

"BRAIN DRAIN"

INTRODUCTION 27

AN EXPERIMENT IN VOLUNTARY REPATRIATION 28
OF HIGH-LEVEL TECHNICAL MANPOWER —
THE SCIENTISTS' POOL
S. P. Awasthi

AN EXERCISE IN VOLUNTARY 36
REPATRIATION IN GREECE
George V. Haniotis

EMIGRATION OF SCHOLARS AND 42
THE DEVELOPMENT OF TAIWAN:
CHINESE-AMERICAN COOPERATION
Joseph B. Platt

Note information concerning
sale of DEVELOPMENT DIGEST
on last page of this issue.

HOUSING AND DEVELOPMENT

INTRODUCTION	47
ECONOMIC ANALYSIS OF HOUSING PROGRAMS FOR DEVELOPING COUNTRIES Leland S. Burns	48
COST-BENEFIT ANALYSIS OF A HOUSING PROJECT Leland S. Burns	53
A COOPERATIVE APPROACH TO HOUSING PROBLEMS IN LATIN AMERICA: THE EXAMPLE OF CHILE Samuel Ruíz Luján	58
HOUSING PROGRAMS IN LESS DEVELOPED COUNTRIES; A PICTORIAL STUDY	67

EFFICIENCY CRITERIA IN DEVELOPMENT AND ASSISTANCE

INTRODUCTION	73
PERFORMANCE: A CENTRAL FACTOR IN DEVELOPMENT Willard L. Thorp	76
ALLOCATING FOREIGN AID TO PROMOTE SELF-SUSTAINED ECONOMIC GROWTH W. Arthur Lewis	81
FOREIGN ASSISTANCE AND SELF-HELP: A REAPPRAISAL OF DEVELOPMENT FINANCE John C. H. Fei Douglas S. Paauw	85
INDICATORS OF SELF-HELP Paul G. Clark	92

WATER RESOURCE PLANNING: DESALINATION

INTRODUCTION	99
WATER COSTS IN DEVELOPING COUNTRIES Joseph Barnea	101
COSTS AND COSTING PROCEDURES IN DESALINATION John J. C. Bradbury	109
RECENT SOURCES OF INFORMATION ON WATER DESALINATION	116
SOME RECENT BOOKS	121
CUMULATIVE INDEX	127
NOTE CONCERNING SALE OF DEVELOPMENT DIGEST AND SUBSCRIPTION BLANK	131

TAKING STOCK OF DEVELOPMENT AND PLANNING

A REVIEW OF ECONOMIC DEVELOPMENT

W. Arthur Lewis

[From Papers and Proceedings of the Seventy-Seventh Annual Meeting of the American Economic Association; published as The American Economic Review, the American Economic Association, Northwestern University, Evanston (Ill.), Volume LV, Number 2, May 1965, US\$ 4.00, pp. 1-15.]

These are excerpts from the paper.

The underdeveloped countries did reasonably well during the 1950s. According to the United Nations' statisticians, gross domestic product increased at an annual rate of 4.6 percent in Latin America, 4.2 percent in the Far East (excluding Japan and mainland China), 5.2 percent in Southern Asia, and 4.1 percent in Africa. At the beginning of the decade, economists were concerned about whether these countries could make the minimum critical effort needed to exceed population growth, then thought to be 2 percent, now accelerating disquietingly to $2\frac{1}{2}$ and 3 percent. Growth rates exceeding 4 percent have shown that capital, entrepreneurship, skill, and foreign trade are not such formidable obstacles as they were thought to be. In reviewing each of these categories, I shall

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use the occasion to consider some of the concepts which economists have been using to analyse the problems of economic growth.

Capital

Capital has not been as scarce as expected, first, because the capital-output ratio turned out to be unusually low, second, because more foreign aid became available, and, third, because some of these countries are managing to increase their savings.

In 1950, economists thought that the capital-output ratio was around 4 (net); actually in the 1950s it has often been even between 2 and 3, both in developed and in underdeveloped countries. We do not yet know why, or whether the change is permanent. Let us note four possible explanations. First, Western Europe has been exploiting a backlog of technological progress, accumulated during the interwar stagnation. The underdeveloped countries may be reaping a similar harvest; they will certainly do so as soon as they tackle their agriculture properly. Second, expenditure on infrastructure may be abnormally low; underdeveloped countries are putting a lot of money into transportation and power, but they are still starving housing and the public services. Third, the high growth rates of industrial production (ranging between 6 and 10 percent) and of services have effected considerable transfers from less to more productive sectors of the economy. And, finally, high rates of growth of population, in countries where land is abundant, produce a proportionate growth of agricultural output, using little capital. The question whether in some other countries, such as India or Egypt, the marginal productivity of labor in agriculture is zero seems to arouse fierce passions, though the answer does not seem to be relevant to any practical problem.

When we turn to the transfer of capital from the developed to the underdeveloped world, we are on firmer ground. The United Nations estimates that the net flow increased from about 2 billion dollars in 1950 to about 6 billion dollars in 1960. Six billion dollars was about $3\frac{1}{2}$ percent of the national incomes of the underdeveloped world and was, therefore, associated with about a quarter of their rate of growth at the end of the decade. This is a very considerable achievement for those of us who have made ceaseless propaganda for foreign aid.

It would be pleasant to be able to report a universal increase in domestic ratios of saving, resulting from these high rates of growth and of aid, but alas, only a minority of countries have risen to their opportunity. The best documentation is for Latin America where, if the Economic Commission for Latin America is right, the ratio of gross domestic savings to gross domestic product fell, for the continent as a whole, from 16.8 percent in 1950-54 to 15.6 percent in 1955-61, or 15.2 percent in 1960. Fragmentary evidence suggests

that the rest of the underdeveloped world did not do much more than maintain domestic savings ratios, but there were also spectacular exceptions, such as India, from about 6 percent (net) in 1950 to about 8 percent in 1960, and Jamaica, from 12.2 (gross) in 1950 to 16.1 percent in 1960.

Some of the countries which failed to improve their savings ratios nevertheless increased the take of public expenditure, which can be just as important for growth. The 1950s were a good decade for education, for public health, and for roads. Since both savings and public expenditure come out of the surplus of output over private consumption and improve future productive capacity, they should be considered together when measuring achievement. Availability of foreign capital enabled some governments to put improvement of the public services ahead of improvements in the savings ratio during the 1950s.

We do not have enough evidence to test theories of how income distribution and the propensity to save change as per capita income increases. The fall in export prices relative to domestic costs was important, since the export sector saves more and is more highly taxed than the rest of the economy. ECLA estimates that adverse terms of trade cost Latin America 3.6 percent of national income, comparing 1960 with 1950, but one would still have expected the savings ratio at least to have been maintained, since per capita real output increased by 19 percent. Presumably, significant changes in private saving require longer periods and bigger per capita changes.

The slow rate of change of private savings is one reason why more importance is now attached to increasing public saving. This, however, is not easy. First, the marginal rate of taxation is lower than the average in most of these countries; so the percentage share of public revenue falls as national income increases. Radical reforms are required in tax structures if public revenue is even to keep up with public expenditure. Second, where public services are rudimentary, rapidly increasing expenditures on these services are just as important as increased savings and will absorb most of the increase in revenues for some time. Third, the rate of change must inevitably be slow. Attaining self-sustaining growth means reducing the ratio of private consumption to gross domestic product from around 80 to around 70 percent. Any attempt to reduce the ratio of consumption by more than about 0.5 percent of gross domestic product per year will defeat itself, and also create political unrest.

Entrepreneurship

Growth rates exceeding 4 percent suggest that the shortage of entrepreneurship cannot have been the major obstacle it is normally thought to be. It is well known that these countries have no shortage of

small-scale entrepreneurship; the desire to make money and the willingness to gamble are universal. What is lacking is the experience of organizing large-scale businesses. Assuming that this lack of experience springs from lack of desire, or from institutional inhibitions, historians have devoted much paper to considering what social and ideological climate spawns successful large-scale enterprise; and the social psychologists have now joined them. The last 15 years have thrown little light on their theories, except, perhaps, to question the quantitative importance of their problem. Perhaps, too, those politicians were right who said that the end of imperialism and racial subjugation would spark a surprising release of energy.

Meanwhile the shortage of large-scale domestic entrepreneurship has been met, to some extent, by foreign enterprise. Here, the 1950s saw a marked change in the attitudes of governments. During the 1930s and 1940s the air resounded with diatribes against foreign investors, but in the 1960s newspapers in Europe and North America are full of advertisements in which the governments of newly independent states offer foreign investors innumerable incentives, including exemption from taxes. Foreign entrepreneurs have not been allowed to do much for agriculture or for trade, but their contribution in mining and manufacturing is a major explanation of the high rates of growth of industrial production.

The shortage has also stimulated governments to assume some of the attributes of entrepreneurship themselves. The governments of underdeveloped countries do not command either the capital or the administrative skills necessary to play any significant role as managers of industrial or agricultural enterprises, though some have tried, often for ideological reasons. They can play a more important role in creating a favorable climate for private entrepreneurship, helping with improved infrastructure, market research, feasibility studies, technical advice, and financial aid.

Development theory makes a great deal out of external economies, whether in explaining the low level of investment, or assessing the advantages of geographical concentration, or tracing the history of growth through linkages, or arguing the case for the government as a promoter of interdependent investments. The analysis has been influential, though factual evidence remains scarce.

Governments have done better at stimulating the private sector than at controlling it, not surprisingly, since both the statistics and the personnel for efficient control are lacking. Many controls have hindered more than helped, especially by restricting the smaller businessmen, some of whom are the hope for the future. Also, the new states often begin with hostility between politicians and administrators, and need to find a new equilibrium which will reduce corruption and arbitrary decisions.

The record is spotty even in the public sector. Most governments have made development plans, but few take their own plans seriously, although planning could undoubtedly help to bring more order into public sector programs. Governments have first to learn to control the public sector before they can hope usefully to control the private sector.

The sector to which government initiatives could contribute most is agriculture, which has, alas, been the most neglected. Everybody talks about the necessary framework for agriculture — the agricultural research stations, the extension agents, farm institutes, animation, water supplies, fertilizers, land reform, and so on — but little gets done. Prime ministers have had their minds on other things: on political questions such as neutralism, Pan Africanism, Afro-Asian unity and the like, or, in the economic realm, mainly on industrialization; and since most great men can achieve no more than one or two things at a time, agriculture has had to content itself with occasional lip service. Agriculture will have to be seen to be important before any considerable progress will be made.

This change is beginning in the countries where agricultural stagnation is the obvious cause of the shortage of foreign exchange, but the crucial role of agriculture is also obvious in the elementary arithmetic of economic growth. It is easy to show that national income cannot attain a rate of growth of 5 percent in Asian and African conditions. At present, none of these countries is able to increase agricultural output faster than 3 percent per annum. Assume optimistically that industrial output increases by 10 percent per annum. Then, if agriculture contributes 50 percent of gross national product and industry 12 percent, the growth of commodity output averages out, initially, at 4.4 percent. Output of services grows slightly faster than output of commodities; so gross domestic product as a whole would grow at a maximum rate of 4.6 percent. Given the failure to reform agriculture, the rates of growth actually achieved in the 1950s are a matter for congratulation. One must assume that the United Nations call for 5 percent in the 1960s is mainly a call for a massive assault on agricultural stagnation, without which such a target is impracticable. Also, the call should not be mixed in with the discussion of foreign aid, since it is with the governments of the underdeveloped countries that the initiative lies in agriculture.

Skill

Shortage of skills has been even less of a bottleneck than shortage of entrepreneurs. In part, this has been due to the large international flow of technical assistance. Despite the break-up of the colonial empires, there are now more European and American technicians in Asia and in Africa than there were in 1950, and the numerous channels

through which this movement is organized are an achievement in which the world can take some pride. Nevertheless, technical assistance is marginal. Leaving aside for the moment the agricultural sector, the amount of skill which these countries can currently absorb is relatively small, mainly because their non-agricultural sectors are relatively small.

Where half the population is in agriculture, the number of jobs requiring a secondary education does not exceed 10 percent of the occupied population, nor do the jobs requiring university education exceed 2 percent. The majority of countries in Asia and Latin America (but not all) have as many secondary-educated people as they need for strictly economic purposes, and many of them have many more such people than they can absorb in current market conditions. There are shortages of particular types. In general there is too much literary education and not enough technological, but this defect is easily remedied. The number of technical institutes and special training institutions has multiplied quite rapidly in underdeveloped countries. What most of the Asian and Latin American countries need is better quality rather than more quantity.

Africa's situation is quite different. There, in 1960, less than 1 percent of the population had received a secondary education and less than 10 percent primary education. This situation is now changing rapidly since these countries have become independent and have made education a first priority.

There is no evidence to suggest that economic development is accelerated by supplying more educated people than the market can absorb. India is one of the best educated underdeveloped countries, but not conspicuously the most successful in economic development. An over-supply of educated people creates great frustrations, stimulates excessive migrations to the towns, and results in political turbulence. All this makes the political situation more exciting; but though the long-run effects of political excitement on development may be positive, the short-term effects seem to be zero, or even negative.

The biggest problem in education is the relation of schooling to agricultural improvement. The problem does not arise in plantation agriculture, since the planters, who are the decision makers, can adopt the latest techniques whether their workers are literate or not. We cannot doubt that literate farmers are likely to absorb new technology more rapidly than illiterate farmers. Illiterate farmers can be taught the most obvious things and have made important decisions, such as changing from subsistence to commercial crops. However, it must be a goal as soon as it is feasible to have an agricultural system in which every farmer is literate.

The problem is in the transition. Putting the children into school, which costs a great deal of money (as much as 3 or 4 percent of national income) does not guarantee that one will have literate farmers. Much depends on the speed with which one moves from 10 percent of rural children in school toward 100 percent, for when the figure is only 10 percent, that 10 percent knows that it will get jobs off the farms, at wages from two to three times as high as the average farmer's income. If one raises the proportion to 60 percent within ten years, as some West African countries have done, the 60 percent also expect to get jobs off the farms at high incomes. They cannot be attracted by three acres and a hoe; only a modernized agriculture capable of high yields per man could hope to hold them. Hence the only way to effect a smooth transition is to keep the rate of modernization of agriculture and the rate of expansion of rural schooling in step with each other. This is not a case for less schooling so much as a case for faster modernization of agriculture — for greater expenditure on research, agricultural credit, water supplies, and so on.

Given the time it takes to organize the right kind of agricultural framework for small farming, expenditure on adult education in the countryside, including short courses for farmers at residential centers and other forms of community development, will probably at this stage prove more productive in Africa than money spent on getting all rural children into primary schools.

Foreign Trade

Foreign trade has played its customary role as the engine of growth in most of these countries, but not in all. Both the terms of trade and the rate of growth of trade have been high by comparison with prewar statistics.

The volume of exports from underdeveloped countries increased at an annual rate of 3.6 percent, which is also much higher than before. However, this rate is lower than the growth of national income because of the important part played by import substitution, especially in Latin America.

We are being deluged with literature arguing that the underdeveloped countries cannot grow at an adequate rate if the developed countries increase their demands for the exports of underdeveloped countries at an annual rate as low as $3\frac{1}{2}$ percent. Such literature ignores the important part played by import substitution in economic development. Most of the calculations assume rates of growth of national income, consumption, industrial production, and imports which are not mutually consistent. A little arithmetic shows that if one assumes continuance of the current rate of growth of industrial production, the underdeveloped countries must soon be supplying themselves

with nearly all the manufactures they need. They have the necessary minerals and fuels, and the skills are not hard to learn. It is better that they should not be forced into autarky since comparative advantage demands that, even if net imports be low, this be only because large imports of some manufactures are matched by large exports of others. Recent international discussion has focused rightly on the market for the manufactures of underdeveloped in developed countries; this is likely to be much more important in the future than the never ending talks on primary products. Some of us believe even that the time is not far off when the underdeveloped will be net importers of primary products and net exporters of manufactures. This is not only because of high population growth, which the new techniques of family limitation will soon begin to control. More fundamentally, it is arguable that the real competitive advantage of temperate countries is in agriculture, since their temperate climates are more favorable to the retention of soil fertility than the harsher climates of the tropics.

To the individual underdeveloped country, import substitution offers less opportunity for growth with diminishing trade than it does to the group taken as a whole. Only the largest countries (possibly China, India, the U. S. S. R., and the United States) have that wide variety of climates and minerals which is a necessary condition for development as a closed economy. Everywhere else a rise in real income must increase the imports of some commodities. These imports have to be paid for either by expanding exports or by releasing foreign exchange through import substitution. In the nineteenth century, growth was sparked by exports, which generated incomes and so also stimulated production for the home market. In the first half of the twentieth century, import substitution has offered some countries an easy path to growth, without dependence on increasing exports. However, once the limits to import substitution are reached, the rate of increase of exports sets a ceiling to the rate of growth of output, since natural resource limitations make it impossible to have balanced growth for the home market only.

The literature on what the Latin Americans call "structural inflation" is much obscured by irrelevancies. Structural inflation is not due to being underdeveloped, to having a high rate of population growth, to exporting mainly primary products, or to having difficulty in raising taxes; the British economy is the clearest contemporary example of structural inflation, and it has none of these characteristics. Neither is structural inflation due to investing more than is saved, or to running a budget deficit; these cause demand-pull inflations, whereas structural inflation is a cost-push phenomenon.

A simple example illustrates the species. Suppose that a country produces only two commodities, motor cars and wheat, and consumes only these two commodities. Suppose also that through technological

progress the output of cars is increased, but structural barriers hold down the output of wheat. The increase in real income increases the demand for wheat. This is met by importing wheat. Thus income generated in the production of cars is used to buy imports; there is a deficit in the balance of payments, and deflation in the home market, represented by a surplus of cars. This structural deflation is turned into structural inflation by the measures taken to right the balance of payments. Devaluation or tariffs or import controls will raise the price of wheat and therefore the cost of living, and so a cost-push inflation spiral will start.

Four solutions are possible. One solution would be to reduce the output of cars to the level of home demand. This reduces employment and damps the rate of growth of national income. We can call this the British solution, since this is what Britain has done regularly over the past 15 years; it is also what Latin American economists accuse the International Monetary Fund, rightly or wrongly, of wanting them to do. The second solution would be to go out into the world market and sell more motor cars. This is the Japanese solution. The rate of growth of the economy is then set by the degree of success in exporting. The third solution would be to break the agricultural bottleneck and have balanced growth in the narrow sense of patterning domestic production on domestic demand. This is the Mexican solution. The fourth solution would be to force the public to consume what is being produced; namely, more cars rather than more wheat, whether by subsidizing cars, or by taxing wheat, or by some system of rationing. This was the old Russian solution.

Only two of these solutions appeal to economists; namely, either to sell more exports or to break the bottleneck. Nothing in economic science can tell us a priori which is preferable, but great passions have been aroused by our prejudices. Economists reared in the free-trade tradition tend to look first for the opportunities for increasing trade; whereas a later generation, which learnt in the interwar years to be wary of dependence on exports, prefers to explore first the opportunities for increasing the productivity of home supplies. Inefficient governments chose neither of these solutions. They either damp down growth or try to push ahead despite imbalances. The latter policy has produced its full crop of foreign exchange shortages, devaluations, and inflations. The process is cumulative; persistent cost-inflation discourages both exports and import substitution, so aggravating the foreign exchange shortage, and giving the spiral another push. Whatever merits a policy of persistent inflation may or may not have in a closed economy, in an open economy it can work havoc with employment and growth, by causing a country to price itself persistently out of world markets. A perpetually overvalued currency can be the chief cause of economic stagnation.

One of the advantages of input-output analysis is that it puts these problems into their proper framework. A projected increase in national income results in projected increases in final demands. In balancing demand and supply for each commodity separately, the law of comparative costs is invoked to decide the appropriate balance between imports, exports, and production for the home market. In less developed countries, the making of such projections could not but improve existing planning procedures, so long as good statistics are available and so long as projection is not confused with prophecy. I suspect that if such exercises were done correctly, most of the countries which have been concentrating on the home market would find that a shift to exports would pay, and most of those now concentrating on exports could do better by giving more attention to import substitution.

Unemployment

One disturbing factor must be set against the high rates of growth of output and investment on which we have been congratulating ourselves; namely, the rising levels of unemployment in the underdeveloped countries. This cannot be documented because there are no reliable statistics of unemployment, but it is everywhere a cause of concern. The phenomenon is unexpected, since rapid growth and high investment ought not to increase unemployment, but to reduce it.

The simplest approach to understanding the causes of unemployment is through the model which divides the economy into a growing modern capitalist sector and a traditional subsistence sector which feeds labor to it as required. Unemployment is growing rapidly for two reasons: first, because the traditional sector is expelling labor too rapidly; and, second, because the modern sector is taking in too few because it is too highly capital intensive.

One reason why the traditional sector is discharging labor too rapidly is the unusually large differential between wages in the modern sector and earnings in the traditional sector. We are used to assuming a differential of about 50 percent, and to assuming that the modern sector can grow at a constant wage level. In the twentieth century, trade-union pressure, nationalistic governmental pressure on foreign enterprises, and the new social conscience of big entrepreneurs are combining to raise wages very sharply in the modern sectors of the developing economies, and it is now not unusual to find some unskilled workers in the modern sector earning three or four times as much as the average small farmer. This causes a sympathetic increase in wages in traditional occupations, and since productivity is very low in these occupations, employers get rid of domestic servants and of the surplus clerks and messengers whom their businesses have traditionally sheltered. The high wages in the modern sector also attract people out of the countryside into the towns, where they manage to live by doing a few hours of occasional work per week.

Imbalance between the modern and the traditional sectors is not confined to wages. An important factor in Africa is the rapid acceleration in the output of rural schools, which are now producing more primary-school graduates than the rural economy is able to absorb at the wages they expect. The excessive rate of growth of a few towns is a problem throughout the underdeveloped world. This is compounded by errors of policy in industrial location and by concentrating development expenditures on these few large towns, making them much more attractive than the villages and the small country towns in terms of water supplies, transportation, schools, hospitals, electric light, and opportunities for unemployment relief.

The other aspect of this problem is the high capital intensity of the new investment, not in the sense of the ratio of capital to output, which we have seen is low, but in the sense of the proportion of the national income invested which is required to provide additional employment for one more man. Most of these countries are surprised at how few people have found employment in the growing sectors of the economy, especially manufacturing, mining, and transportation, despite the high investment which has been taking place.

High capital intensity is appropriate when it embodies greatly superior technology, without demanding very high skills. The Ohlin approach to comparative costs puts us against high capital intensities, but Ohlin's model assumes that countries have the same technology and differ only in the relative scarcity of resources. In comparing developing with underdeveloped countries, it is more appropriate to use the Ricardian version of the law of comparative costs, which stresses instead relative differences in productive efficiency. Now there is no a priori reason for developed countries to have a comparative efficiency advantage in capital-intensive industries, and one can easily construct cases where the comparative advantage remains with the underdeveloped country, even when the relatively higher cost of capital is taken into account.

Economic theory offers no reason why development must increase rather than reduce employment. Capital investment, as such, must increase employment in a system with an infinitely elastic supply of labor, since it cannot pay, in such a system, to increase the ratio of capital to labor. Just as important as capital investment, however, is the introduction of new technology. This may operate in either direction, but, on balance, tends to be labor-saving. The underdeveloped economies lag so far behind in technology, that the opportunities for introducing labor-saving methods are immense, and it could well happen that the new employment created in the factories, in modern forms of transportation, and in modern services could be more than offset by the employment destroyed in handicrafts, traditional forms of transportation, and old-fashioned types of personal service.

This possibility is heightened by the tendency of wages to rise sharply in the modern sector. The higher wages are, the more it pays to import cheap machinery from the developed countries, and therefore the less employment investment creates. Not only are the newest industries highly capital intensive, but some of the well established older export industries, such as mines and plantations, are finding themselves squeezed by their inability to pay the wages that are being demanded and offered by more profitable enterprises; and the opportunities for import substitution are also diminished. Professors Liebenstein and Galenson have urged upon us the desirability of high capital intensity in underdeveloped countries as a source of profits and therefore of savings and investment. Unfortunately, that policy would be feasible only if the labor surplus remained disguised and could therefore be ignored; it is not practicable when the unemployed are roaming the streets and burgling your houses. Most developing countries have to give the highest priority to providing employment now rather than to maximizing consumption or income or employment in ten years time.

Economists have also developed a theory of the desirability of assessing the real social value of a project by calculating with shadow factor prices differing from the actual factor prices. In the situation described, they would recommend calculations in which the existence of unemployment is recognized by attributing a wage to labor below the actual wage. This is arguable on paper, but how does one translate it into practice? Investment decisions are made, not by economists making calculations in government offices, but by private decision makers and by civil servants, all of whom are under pressure to produce at minimum costs in money terms, and the government does not possess the resources with which to subsidize labor so as to bring the wage down to the shadow price, or the administrative capacity to substitute an effective licensing system for the price system of the market. The only way to achieve decision making on the basis of a low shadow wage is to have a low actual wage.

Recognition of the connection between wages and employment has opened up a gulf between trade-union leaders and political leaders in new states, especially where the government is the chief employer of labor, or is concerned about the adverse effects of high wages on exports, import substitution, and employment, or even prefers high profits to high wages because it can tax profits more easily than wages. Governments have therefore begun to think in terms of an incomes policy. Minimization of unemployment requires that wages should be tied to average agricultural incomes at a level sufficiently high to produce the labor required by the expanding nonagricultural sector, but no so high as to produce a great outflow which the towns cannot yet absorb. If, at the same time, vigorous measures are raising agricultural productivity, mass consumption will rise sharply, not merely because people

are transferring from the lower level of the traditional sector to the higher level of the modern sector, but also because both levels are rising. Without some such policy, development must result in sharply increasing unemployment.

We are back in the political sphere. Trade unions are not likely to accept an incomes policy from governments in which they have no confidence, whether because the politicians are corrupt, indifferent, reactionary, or inefficient. Economists in the twentieth century usually call upon governments to redress the imperfections of the market, just as their forebears in the nineteenth century looked to the market to replace the imperfections of the government. The last 15 years have lengthened the list of things which governments can usefully do and improved the statistical and theoretical tools for making decisions, but only a handful of governments show promise of rising to their opportunities. Here the economist must hand the development problem over to his colleagues in the other social sciences.

A REVIEW OF PLANNING

Albert Waterston

[From "What Do We Know About Planning?," a speech prepared for the Tenth National Conference of the United States National Commission for UNESCO, "Man, Knowledge, and Freedom in International Development," Kansas City (Mo.), 16-19 November 1965. The speech is also published in the International Development Review, Society for International Development, Volume VII, Number 4, December 1965, pp. 2-10, and will appear in Finance and Development, The Fund and Bank Review in June 1966.]

These are excerpts from the paper.

The phenomenal spread of national development planning since the end of World War II has left few countries without some kind of plan or plan organization. In Asia, every country but one has a development plan. Only Ruanda, among Africa's independent states, has not formulated a development plan. The Alliance for Progress — whatever else it may have done — has caused all Latin American countries to establish or strengthen their planning machinery and to give more attention to development planning. In the face of the worldwide spread of development planning, it is reasonable to ask what we know about planning and what we have learned from experience.

If the considerable accumulation of planning literature is examined, little will be found about the actual problems encountered. Most writers on

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planning have been primarily concerned with how planning ought to be practiced rather than with how it is practiced. They have not focused attention sufficiently on the problems which, in practice, have tended to frustrate the econometric techniques which constitute the main stock in trade of the modern planner.

Furthermore, no study had attempted a comparative analysis of the planning experience in a sufficiently large number of countries, which could support valid generalizations about the kinds of planning which have been shown to work well; the forms of planning organization which have been most effective; planning pitfalls encountered in the formulation and implementation of plans; and whether, indeed, countries need plans or central planning agencies to achieve and maintain high rates of development.

In an attempt to determine when, how, and why planning has been successful and unsuccessful, and to draw relevant lessons of wide applicability from the experience of countries which have been more or less systematically planning their development, a small group within the World Bank has, since 1958, been assembling, classifying, and analyzing planning data of well over 100 countries, developed and underdeveloped, with socialized and mixed economies. The resulting study, Development Planning: Lessons From Experience, was published in December 1965. [Reviewed in Development Digest, January 1966]

Theory and Practice

As was to be expected, wide discrepancies between theory and practice were frequently encountered, and this led to attempts to reconcile the two. Sometimes, the resolution required proposals for changing practice, but at other times it seemed more appropriate to recommend adjustments in theory. Two examples are cited below.

Most planning experts strongly advocate the use of a rolling plan, in which a year is added to the end of the plan period to replace each year as it is completed, because of its many advantages, which include plan continuity and flexibility. Yet the study disclosed that, for cogent technical and political reasons, no country has actually adopted the rolling plan technique. In this case, it was possible to suggest ways in which practice could be brought into line with what seemed to be sound theory.

In the case of the duration of plans, however, the reverse appeared to be desirable. Most theorists have opted for medium-term plans of five to ten years. But, experience has clearly demonstrated that most less developed countries do not know how to plan effectively for a period of much more than three years, and many cannot plan for more than a

year or two at a time. The study therefore suggests that, in at least some countries, theory may have to give way to the exigencies encountered in practice.

Learning From Other Countries

While countries about to start planning their development can learn much from the planning experience of other countries, few make effective use of this experience. Partly, this is because the experience of other countries is not always known; but mostly, it is because countries refuse to be guided by the experience of other countries, since they consider their own political, economic, and social conditions to be unique. Yet the study reveals that most countries not only encounter the same planning problems, but make the same mistakes. Thus, they frequently confuse the mere formulation of a plan with planning, prepare plans with surprisingly similar defects, and fail to take adequate account of what can be done (and hence plan for less than is realistic in some sectors and more than is realistic in others). They have their planners take on extraneous tasks which divert them from planning, set up unsuitable planning machinery in the wrong places, and so forth.

There are, of course, dangers in the uncritical adoption by one country of the planning machinery and practices of another. Here, limited experience can be worse than none. For example, a foreign expert once designed a plan for the island of Singapore, basing his recommendations on his long experience in India. The planning organization he designed was so large that one might have been led to suspect that he sought to solve Singapore's unemployment problem simply by absorbing the unemployed into the planning organization!

What may happen when a less developed country adopts a more advanced country's planning system has nowhere been revealed better than in Morocco. Soon after independence, the Moroccans transplanted the complex French planning apparatus in their own country almost without change. The French system worked poorly, because Morocco was not equipped to make effective use of a planning system which depended on a well coordinated public administration operating under broadly agreed and consistent directives.

In countries at the beginning of their development, a much simpler system of planning is indicated. The French system of "indicative" planning is based on cartelized industries, many of them nationalized, public investments which approximate half of the total investment in the country, a nationalized credit system and government controls over private industrial financing, a weak trade union movement, a tradition of close cooperation between business and government, and a civil service of unusual competence. Few less developed countries can lay claim to a similar set of circumstances.

Plans Versus Planning

Planning has undoubtedly promoted development in many countries. However, postwar planning history reveals that there have been many more failures than successes in the implementation of development plans. Indeed, among developing nations with some kind of market economy and a sizeable private sector, only one, Yugoslavia, appears to have fulfilled reasonable plan targets over an extended period of years. In the early 1960s, even Yugoslavia fell so short of attaining its plan targets that it had to abandon its five-year plan.

The great majority of countries have failed to realize even modest income and output targets in their plans except for short periods. What is even more disturbing, the situation seems to be worsening. Thus, in Asia, where countries have had more experience with planning than those of any other region, the rates of growth in the early 1960s have fallen short not only of planned targets but also of the growth rates of the 1950s. The situation is not very different elsewhere. In contrast, some countries without national development plans or national planning agencies have been developing far more rapidly than most countries with them. For example, Mexico between 1940 and 1955 (and even until now, since in fact it has no plan to which the Government adheres), maintained an annual average rate of growth of 5 to 6 percent. Israel, which had no plan before 1961 and still does not have one which the Government follows, has been able to maintain an even higher growth rate. Puerto Rico has become a showcase of development without benefit of a plan. Among the more developed countries, Germany without plans has increased income and output at least as rapidly as France with plans.

It could be contended — as I do — that, if these countries had had development plans, they might have done even better. But, of course, this is not the same as saying that a development plan is necessary to ensure rapid growth, and it certainly is not a sufficient condition for development. A development plan is not the same as development planning, a process that involves the application of a rational system of choices among feasible courses of investment and other development actions based on a consideration of economic and social costs and benefits. Planning as a process is an indispensable precondition for the formulation of effective development policies and measures.

A plan can play an important part in the planning process when it makes explicit the basis and rationale for planning policies and measures. But if a plan is prepared before the process has begun in earnest, or if it is unable to generate the process, it is likely to have little significance for development.

In contrast, one might say that countries which grow rapidly without plans are nevertheless planning in the sense that they are guided by rational programs of action designed to achieve their development goals. These programs may be coordinated through budgets for public investments and through a series of government policies designed to stimulate private investments along certain lines.

Importance of the Political Factor

Why are so few development plans carried out? Lack of adequate government support for the plans is clearly the prime reason. This lack of support manifests itself in many ways, among which the failure to maintain the discipline implied in plans and the failure to adopt appropriate policies and measures to implement them are most important.

Where a country's government is reasonably stable and its political leaders give development high priority, the country generally develops, even when there is no formal plan. Conversely, in the absence of political stability, and firm and continuing government support, development plans, no matter how well devised, have little chance of being carried out successfully. The cardinal lesson is that sustained governmental commitment is a sine qua non for development.

Pakistan's planning experience, for example, gives dramatic evidence of this. Although the planners of Pakistan's First Five Year Plan produced a development plan with targets well within the limits set by available economic and financial resources, the Plan did not get very far. Given support from a new, strong, and stable government leadership, the Second Five Year Plan promises to overfulfill its main targets and objectives.

Experience has been similar in other periods and countries. In the nineteenth century, Japan, with fewer resources than Burma, China, India, or Indonesia (it had only skilled manpower and waterpower), nevertheless became the most industrialized country in Asia. In large part, this was made possible because of sustained effort supported by a determined government. In the twentieth century, the histories of such diverse countries as Mexico, Israel, Yugoslavia, the U.S.S.R., and China (both Mainland and Taiwan) give ample evidence of the importance of firm and continuing support from a stable government for the development of a country.

One hears much about the need to find ways and means to imbue the people of this or that country with an understanding of their country's plan and to evoke their desire to participate in the planning effort. But, until the political leadership of a country becomes deeply committed to development, the people are unlikely to show much interest. Political leaders often give other matters higher priority than they give

to development and planning. Among these other matters are nationalism, internal politics, defense, territorial expansion, the formation of international alliances or power blocs, and short-run economic problems. It may be that, at some time in a country's history, one or more of these may be more important than development, but it must be recognized that relegation of development to a subordinate place in the scale of values of political leaders can only depress development efforts and, hence, the results of development planning.

Economic Incentives

If a country's leaders make development one of their central concerns, the people can be interested. But except temporarily, for example during or immediately after a war or other catastrophe or upheaval, people are unlikely to become concerned with development objectives through appeals to their patriotism, devotion to abstract ideals or altruism. Direct government controls over economic activity, or threats of imprisonment or other punishment are also generally ineffective.

The evidence teaches that the best long-run method of eliciting behavior which conforms to planning objectives is to make it profitable for people to act in ways required to achieve these objectives. Where governments have replaced restrictive administrative controls by well devised and adequate economic incentives, the results in accelerated economic activity have usually been unmistakable.

In Pakistan, for example, government officials as well as competent outside observers agree that administrative restraints seriously hampered industrial growth during the First Plan period. They attribute the high rate of industrial progress during the Second Plan period largely to the reduction of government controls over imports and foreign exchange, and the introduction of a system of tax incentives and bonuses which encouraged businessmen to expand plant capacities and output. In Pakistan's agriculture, also, the use of incentive prices played an important part in increasing production.

Since the early 1950s, when Yugoslavia replaced centralized controls based on the Soviet model with decentralized management of the economy, that country has evolved a system of economic incentives based on appropriate tax, credit, and price policies by which workers and enterprises are rewarded, largely in accordance with their efficiency in increasing quality and output. These incentives have proved to be so effective in raising production that other Eastern European countries are adopting major elements of the Yugoslav system.

In contrast, many governments in countries with mixed economies persist in relying on direct controls and administrative intervention in

the private sector in preference to incentives, and often depress their economies as a result. India has frequently been cited as a country where government controls exercise an inhibiting effect on development. There are many others in the same category.

Separation of Plan Formulation from Implementation

If, as indicated, the foremost reason why plans are not carried out is political, the second most important reason is technical. From the technical point of view, the failure to carry out plans is largely attributable to the omission in most plans of adequate provision for their implementation. Experience shows that nothing is more conducive to bad planning than the separation of plan formulation from provision for implementation. Planning cannot leave off where plan formulation ends and action to execute a plan begins. Every target must be accompanied by policies and measures which have been devised specifically to fulfill it — otherwise it becomes only a forecast or a projection.

Where plan formulation is divorced in practice, if not in theory, from plan implementation, as it has been in many countries, one finds that planners pay little attention in their plans to the choice of means to be employed to achieve plan targets. This is why most plans provide detailed information only about what is to be achieved, but not about how to go about securing development objectives or targets or about who should be responsible for carrying out the required tasks.

The case of Nigeria's National Economic Plan for 1962-68 is illustrative of the widely held belief that a plan comes first and that measures to implement it can be postponed until after the plan has been accepted. Policy changes needed to achieve the planned allocation of resources and to implement targets were not included in the Plan; instead, they were left to be initiated at a later time by the ministries concerned with the various programs.

The organic link between the targets in a plan, and the policy and other measures required to attain them is a concept which many planners and political authorities find difficult to grasp. Many planners consider that their job is finished when they have prepared a plan and that it is up to others to work out the detailed policies and measures needed to implement the plan. There is frequently a lack of understanding in developing countries that investment is not enough to insure growth; that spending the money you have to the best effect is frequently more important than getting more money to spend.

Most plans are prepared in central planning agencies whose officials have little authority to influence instruments of economic policy and administrative measures formulated elsewhere. Consequently,

one often finds countries where tax, price, monetary, and credit policies impede rather than help to realize plan objectives. For instance, in Pakistan, agricultural price policy discouraged farmers from planting crops whose output the First Plan sought to increase.

Planners, mostly trained as economists, are understandably more concerned with the internal content and consistency of their plans than in plan execution, which is largely an administrative and political matter. When things go wrong, as they often do, planners divide into two main groups. One tends to believe that better planning depends on further improvements in imperfect planning techniques; they therefore busy themselves with more advanced model-building exercises, simulation and input-output technique, operations research, the theory of games, etc. The second group tends to feel that the shortcomings in the planning process reflect inadequacies of the administrative and political environment within which plans must be implemented rather than deficiencies in planning technique. Whatever their position, they are not very likely to concern themselves with the problems of public administration and politics.

Discounting Overambitious Plan Targets

Of course, a planner cannot do much about a government's administrative inefficiency and its lack of political commitment or will to develop. But if, in preparing his plans, he ignores these critical factors, which constitute the main limitations on the ability of most less developed countries to realize their economic possibilities, he ends up with a plan that is divorced from the real world.

This is precisely what happens in most less developed countries. National developed plans are based on a country's economic potentialities or its needs as determined by population growth and are little related to the country's administrative capacity or the government's will to implement the plan. In these countries, plans are not so much blueprints as hortatory instruments of propaganda. It can hardly be surprising, therefore, that most plan targets are never achieved.

If planners are to set realistic targets in their plans, they must somehow find means to measure quantitatively both administrative inadequacy and the lack of political will to develop, in order to "discount" the overly optimistic results obtained when plans are formulated solely on the basis of economic potentiality. It may not be easy to obtain these measurements, but it is not impossible. For example, the cost of administrative inefficiency can be quantified, in terms of money and time, on the basis of past discrepancies between original estimates and actual performance for projects and programs in different sectors. These data, which are available wherever projects and programs have been carried out, can be used to adjust cost and time of construction

estimates furnished by sponsors of projects and programs where their previous estimates have been shown to be over-optimistic. By deflating these estimates by a factor based on their past errors, such adjustments can go a long way toward closing the gap between promise and performance.

Similarly, it is possible to quantify a country's political will to develop if planners can set up, for each major policy area (e.g., in taxation, credit, investment, money, and incomes), feasible alternatives from which political authorities can make a choice before a plan is drafted. In the process of selecting the alternatives which suit them most, political authorities will be supplying concrete and specific information about the extent to which they are prepared to adopt policies and other measures for furthering development which, collectively, can be said to constitute a veritable measure of their "will to develop."

If the three basic elements which enter into the planning process — economic potential, administrative capacity, and political will to develop — are all taken into account in plan formulation, plan targets are bound to be more in line with a country's real capacity to achieve its economic potentialities. Lower targets would expose the restrictive effects of administrative inefficiency and political inaction on economic potential. Hopefully, this might lead governments to improve economic policy and public administration.

The Projects Problem

The current artificial separation between plan formulation and implementation also accounts for the failure of planners to recognize soon enough that the basic weakness in most developing countries is lack of well planned individual projects that can be carried out and operated efficiently after completion. In many countries, planners have found, after they had prepared their plans, that there were not enough projects available to carry out the plans they had fashioned with great care. For example, after 18 months of work on Bolivia's Ten Year Plan, the planners found themselves in the embarrassing position of conceding that "the principal deficiency that will be noted in the formulation of the present Plan is the small number of specific investment projects..." ready to be implemented. Similar statements can be found in the plans of other countries.

It usually takes several years to identify and prepare good projects in the quantities needed to implement a plan. Unless sector, feasibility, and engineering studies for projects have been initiated long before, there is not much planners can do when a plan is being formulated, except to note the lack of projects and programs needed to carry out their plans. This is why it does little good to prepare a

macroeconomic plan with growth targets unless preinvestment and investment studies are sufficiently advanced on the projects needed to give effect to the plan targets. Since effective projects and sector programs should be prepared in operating agencies that will execute them, the organization of programming units in these agencies should get much higher priority than it has in many developing countries, perhaps even higher than central planning agencies.

It is not very hard to devise a development plan for most countries in the early stages of development. The sectors with the highest priority are usually agriculture, transport, and electric power. In some countries another sector may be equally important. The basic sectors are usually few and easily recognizable. Experience with Iran's Second Seven Year Plan, as well as with others, suggests that rule-of-thumb distribution of available resources among basic economic sectors, when needs in every one of them greatly exceed available resources, is unlikely to yield appreciably worse results than distribution determined by careful and prolonged macroeconomic calculations. As a rule, it is also easy to select the highest priority projects in each sector because they are generally well known. The problem is not so much to find high priority projects in quantity as it is to prevent the dispersion of available resources over too many projects.

Coordination of investment through the budget, although not as desirable as through a plan, is often feasible. Improved budget offices may also be more important than improved central planning agencies.

If a plan is considered desirable, it does not have to be a comprehensive plan for six or ten years requiring two or three years to prepare; the evidence reveals that, in most countries, a partial plan covering the public sector for one, two, or three years, which can be prepared for most developing countries in a few months, will not only suffice to get things going in the right direction, but will do so more rapidly than a comprehensive plan. Any imbalance and waste is likely to be more than outweighed by earlier gains in output and income. France, India, Pakistan, the U.S.S.R., and most other socialized countries began with partial plans, and the results obtained indicated that they were justified in doing so.

Most less developed countries run into great difficulties, not in formulating plans, but in preparing and carrying out projects and in trying to operate them efficiently. In part, this is because planners are better versed in the broader macroeconomics of model building than they are in the microeconomics of project selection and preparation; in part, it is because operating organizations in most less developed countries do not know how to prepare sound projects; and in part, it is because it takes much longer to prepare many projects needed to

implement an aggregative plan than to formulate even an elaborate comprehensive plan. Thus, it may take five years merely to establish whether there is enough water for a hydroelectric project at a given site.

Unfortunately, few projects are carefully worked out before construction begins. As a result, many projects and programs are not carried out at reasonable cost and in reasonable periods of time. Attempts to reduce the time spent in project preparation frequently result in the choice of low-yield projects; substantially increased costs and delayed construction because of unanticipated technical or other problems; poor phasing of raw material, transport, staffing, or other requirements; failure to provide adequate financing, shoddy construction, and inability to make full use of completed projects.

Conclusions

Changing the planning mix. One reasonable conclusion to be drawn from experience, therefore, is that it may be desirable to reverse the usual proportions of the planning mix in most developing countries. Planners have almost invariably concentrated on aggregative planning rather than on the proper preparation and execution of projects. As indicated earlier, the empirical evidence suggests that countries with well prepared projects, coordinated by sound budgetary procedures and controls, can dispense with comprehensive plans, at least for a time, and still maintain high rates of growth. Conversely, when well prepared projects or sound budgetary procedures are lacking, even a good aggregative plan is of little value in bringing about a significant acceleration in the rate of development. It is clear that improvements in project preparation and budgetary controls, where needed, are at least as urgent as the preparation of aggregative plans.

It is obviously desirable for countries to prepare an aggregative plan, as well as to improve project preparation and budgetary controls. But, governments in less developed countries have only limited ability to undertake these tasks simultaneously. Experience shows that where governments try to do all three at the same time, improved project preparation and execution, as well as budgetary betterment, almost always give way to the preparation of an aggregative plan.

Changing the planning sequence. These findings obviously have an important bearing on the sequence with which planning problems ought to be attacked in developing economies. If the planning process is to be realistic, then planners cannot start, as they frequently do, with a series of theoretical abstractions of planning as it ought to be and try to force them on an inhospitable environment where governments are unstable, not genuinely committed to development, or otherwise unready for genuine planning. Instead, while not forgetting the long-run

objectives that theory demonstrates are to be desirable, they must attempt to mold their plans to "things as they are," at least at first. This implies that greater emphasis be given to microeconomic aspects of planning, to sound policy formation and improved organization for coordinating investment, rather than to the preparation of neatly integrated macroeconomic plans.

Ideally, planning should be undertaken "from the top down" as well as "from the bottom up." But experience reveals that in most countries planners begin with the first and rarely get around to the second. Since planning from the bottom up is essential to development, while planning from the top down is not, it seems sensible for a country to begin with the preparation of sound projects and sector programs and, with these as a foundation, to advance toward comprehensive planning as rapidly as circumstances permit.

A NOTICE TO READERS

Our aim, in preparing the Development Digest, is to choose the material of general relevance from the development literature which will be of greatest practical value to our readers. We do not provide technical information of a specialized nature. Also, we generally avoid academic hair-splitting and ideological disputes which seem to have little practical significance.

We try to fulfill these aims here at the National Planning Association. Much material from all over the world comes to us. Nevertheless, we are bound to miss some good material on development and are anxious to improve our coverage.

Digest readers are scattered over almost all of the countries of Latin America, Africa, and Asia. You are in daily contact with the development problems of your countries. We know that you must see material that you think the Digest should reprint. We also believe that you must have ideas about what subjects we ought to cover, about how we could improve the usefulness of the Digest to you and to others working in the common struggle for development. We welcome all suggestions and submissions of material. We can't promise to agree with you or to print your material, but we certainly will carefully consider any suggestions, papers, or articles sent to:

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"BRAIN DRAIN"

Until their facilities for higher education are much better established, most less developed countries must send some of their best students abroad for advanced, specialized training. Several writers have recently turned their attention to the loss these countries suffer when students fail to return.

India has devoted more thought to regaining the services of her expatriate men of science than has any other low-income country. S. P. AWASTHI deals with the system his country has evolved, some of its shortcomings, and recent attempts to improve it. George HANIOTIS describes efforts by the OECD and the Greek government to adapt lessons learned from Indian experience to the Greek situation. An example of international cooperation on the non-government level to attack the problem of Taiwanese-United States "brain drain" is described by Joseph PLATT.

AN EXPERIMENT IN VOLUNTARY REPATRIATION
OF HIGH-LEVEL TECHNICAL MANPOWER —
THE SCIENTISTS' POOL

S. P. Awasthi

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These are
excerpts
from the
article.

A debit item on the manpower balance-sheet of India during the last decade has been the non-return of a considerable proportion of students going abroad for higher studies in science and technology.

To deal with the problem, a two-pronged policy has been evolved. Large-scale development of facilities for education and training in science and technology has been undertaken in the country itself and, secondly, measures have been taken to promote repatriation of Indian scientists in foreign countries.

The present article attempts to study and evaluate the efforts made so far for encouraging the return of Indian scientists abroad, with special reference to the Scientists' Pool.

Indians Abroad and the National Register

At the end of the First Plan period, it was found that while the shortage of high-level scientific and technical manpower constituted one of the major obstacles in the successful execution of the development programmes, an appreciable number of our scientists were being absorbed into the economies of the countries where they had gone for higher studies.

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According to one estimate, there were over 5,000 Indians holding scientific and technical qualifications in foreign countries. More than half of them were engaged in "paid service." They constituted a valuable reservoir of high-level skills with varied experience precious to a developing country like India. It was necessary to pool and classify the academic qualifications and experience of these scientists before formulating incentives for their return. For this purpose, it was decided to add a special section to the National Register. The National Register was started by the Council of Scientific and Industrial Research (CSIR) in 1948 for registration of academic qualifications and related particulars of high-level scientific and technical manpower in India. The new "Indians Abroad" Section started functioning soon after the Second Plan was launched in 1956.

As with the rest of the National Register, registration in the "Indians Abroad" Section is voluntary, which is only proper considering the futility of pressing those not interested in returning in the foreseeable future to get themselves registered. However, mere registration would be of little value, even to those interested in returning or planning to return, unless it improved their prospects of obtaining employment. Therefore, arrangements were made for the circulation of the relevant information on the registrants to various prospective employers in the public as well as in the private sector. They were also requested to contact registrants whom they might wish to employ directly. It was decided, in addition, to treat all registrants as candidates for employment in posts under the Government of India. Most of the state governments also took similar steps in regard to posts under their jurisdiction.

Inadequacy of the National Register

These measures, however, were found inadequate. An analysis of the response to the registration drive has indicated that duly completed registration forms were received from barely 18 percent of the Indian scientists abroad. The lukewarm response to the scheme was not surprising. Entry into a large chunk of employment avenues existing in universities and research institutions, private industry, state undertakings, and other quasi-governmental organisations was possible only after interviews. Registration in the "Indians Abroad" Section was of little avail in such cases. Even those who returned to India for the purpose of improving their chances of quickly finding some suitable post faced uncertain prospects. The inelasticity of the recruitment procedures strained the patience of some of them far too much. They left India to seek employment in other countries.

Such a situation was far from satisfactory, especially when a considerable number of posts in India were lying vacant for want of suitably qualified candidates. Evidently, there were gaps in the policy for

registration of high-level manpower abroad. Was it easier to negotiate a suitable post from abroad after registration? Did registration guarantee a permanent job immediately upon return? A host of such questions were bound to be asked by well qualified scientists abroad before formulating plans to return. To allay their apprehensions, it became necessary to offer a more positive inducement. Earmarking suitable jobs for them, either well in advance or immediately upon their return, would have involved a good deal of advance mapping of fields where foreign-trained manpower was required. The situation could hardly await such a time-consuming solution. The next best alternative was to evolve a scheme which would guarantee temporary placement to highly talented Indians abroad on their return as a base, so that they might get some breathing time to explore various avenues of employment in the country. Concerned with the mounting loss of precious, high-level manpower, the Manpower Committee of the Cabinet, in late 1958, decided to set up a pool for temporary placement of well qualified scientific and technical personnel returning from abroad until they would be absorbed into suitable posts on a more or less permanent basis.

How the Scientists' Pool Works

The introduction of the scheme for constitution of the Scientists' Pool had the desired effect on the volume of response to the "Indians Abroad" Section. The scheme envisaged that all registrants returning to India in the immediate future would be automatically considered for selection as Pool Officers. This inducement was surely an attractive one. In addition, a berth in the Pool ensured relatively easy access to all possible avenues of employment, whether in public sector or in private industry. Not unexpectedly, therefore, the coverage indicated improvement.

Selection requirements. Registration in the special section of the National Register is not a necessary prerequisite for selection to the Pool. Experience of the working of the Pool, however, indicates that cases of selection of non-registrants are few.

Also, while the scheme is primarily intended to offer temporary placement to well qualified scientists returning from abroad, it cannot be denied that the inelasticity of the recruitment procedure may create difficulties even for those in India with high qualifications from Indian universities. Provision was, accordingly, made for scientists educated and trained in India.

The scope of the Scientists' Pool has been recently enlarged to include persons with high qualifications in humanities and social sciences as well.

Size. At the time of the Pool's inception, provision was made for review of the initial capacity of 100 as often as necessary. It was raised to 500 by stages. Even this was found to be inadequate. It was consequently decided that even this limit could be exceeded if, at any time, competent persons were available for appointment to the Pool. The working strength of the Pool crossed the limit of 500 soon after this decision was taken and reached 562 on January 1, 1965.

Recruitment procedure. The pragmatic approach of the framers of this scheme is equally discernible in the procedure for selection. It is specially designed to avoid delays. To this end, authority is vested in a specially constituted body called the Special Recruitment Board. In order to ensure selections strictly on the basis of merit, experts in different subjects of specialisation are associated with the Board when necessary.

Any attempt to assess merit will be of doubtful validity if there is an exaggerated emphasis on educational attainments. This is particularly true of developing countries like India where broad-based technical education is of comparatively recent origin. Selections are made, as far as possible, on the basis of academic record conjugated with research experience and output. The elaborate formality of interviews is avoided to the extent possible. Only those candidates are called for interview about whom available particulars are insufficient. During the period from 1961 to 1964, for example, only about 18 percent of the persons considered for selection were called for interview.

Until 1960, selections to the Pool were made once a year. The practice of bulk selections, however, exposed well qualified scientists returning from abroad to unnecessary hardship during the intervening period. To ensure that deserving scientists do not have to wait any length of time after their return, arrangements have been made to select them on an almost continuous basis. On an average, deliberations for selection are being conducted every third day. Interviews are also arranged frequently.

Salaries. The minimum salary payable to Pool Officers is equivalent to the initial salary of junior officers of the CSIR. The salary fixed by the Special Recruitment Board is not intended to be the market value of the scientists concerned. Its fixation is unrelated to the job assigned while working in the Pool. In fact, the salary paid to the Pool Officers somewhat resembles a "return scholarship."

Placement. Every effort is made to accommodate the preferences of the candidates selected in regard to their temporary placement. Particulars of the selected candidates are forwarded to suitable organisations in the light of candidates' preferences and a formal appointment order is issued after consent is received from any one of the

organisations concerned. Efforts are made to arrange the placement as expeditiously as possible and, in many cases, it is finalised even before the arrival of the selected candidates in India.

Over 200 organisations in the country, including national laboratories, universities and scientific institutions, government departments and enterprises of the central and state governments have Pool Officers attached to them. Although they are considered to be officers of the CSIR, the Pool Officers work under the administrative control of the organisation to which they are attached. The organisations keep the CSIR informed about the performance of the Pool Officers through half-yearly assessment reports.

Duration of stay. There is no limit to the duration of stay in the Pool. However, the Pool Officers are expected to make efforts on their own to secure regular employment without much delay. There is a built-in disincentive for an indefinite stay in the Pool in the decision not to give annual increments in salary to Pool Officers. In addition to the efforts made by Pool Officers for finding suitable employment, their names are referred against suitable vacancies and their qualifications, experience, and employment preferences are circulated widely among employing agencies in the public and private sectors by the CSIR.

The purpose of formulating these measures was to ensure quick and continuous turnover of the membership of the Pool, with older entrants making room for newer ones. This, however, is not happening. During the beginning of 1964, the proportion of those who continued working in the Pool for a period beyond 12 months was nearly 30 percent; it rose to nearly 40 percent during the year.

Special posts for Pool Officers. The growing concern about the dormant constituents of the Pool is well reflected in the decision of the CSIR to consider the Pool Officers who have stayed in the Pool for over a year for appointment to special posts. Under this scheme, introduced in late 1963, the Indian Government has authorised all approved scientific institutions and state undertakings to create a certain number of posts to which temporary appointments can be made quickly from among scientists working or studying abroad, and also those in the Pool, wherever suitable candidates are available. The full impact of these appointments on the rate of offtake from the Pool is yet to be felt.

An Evaluation of Results

Indian scientific and technical personnel abroad may be divided into two groups; those who have registered themselves in the "Indians Abroad" Section and those who have not. The number of those not registered is not precisely known though, as indicated earlier, their

proportion in relation to those registered is falling. The non-registrants are mainly those who are assured of employment on return or those who do not propose to return immediately. It is probably for these reasons that the response from non-registrants has been negligible.

The selection to the Pool has been mainly from registrants. It is estimated that about 10,000 persons were enrolled in the "Indians Abroad" Section at the beginning of the current year. Almost one-third of them had been selected as Pool Officers. Actually, the ratio is much higher, because all registrants are eligible for consideration in the Pool Scheme. It is meant to attract only that segment which is both highly qualified and planning to return or already in India. The percentage of selection to the Pool from this category of registrants has been high. During the two-year period 1963-1964, for which relevant data are available, between 80 and 85 percent of those considered for selection as Pool Officers were offered appointments.

But how many of them have returned? How many have not? Is a further breakdown of these numbers possible? How many of those returning joined the Pool? What is the direction of offtake from the Pool? An attempt is made in the following paragraphs to answer these questions.

Out of 3,258 persons selected to the Pool up to the beginning of 1965, 3,182 were from abroad. As indicated in Table I, more than 60 percent of the candidates have returned.

Table I. Return of Candidates Selected to the Scientists' Pool
(January 1, 1965)

Category	Number	Percentage
Trained and/or Educated Abroad	3,182	97.7
Of Which:		
Repatriated	2,016	61.9
Now Abroad	1,166*	35.8
Trained and Educated in India	76	2.3
Total	3,258	100.0

*Includes 52 persons who left India after joining the Pool. It is assumed that these "expatriates" had earlier returned from abroad on selection.

Table II indicates the position of candidates selected in relation to their entry to the Pool. The first category includes those scientists who have indicated their non-acceptance of the Pool offer. The second category includes scientists who are in various stages of joining. The third category consists of Pool Officers.

Table II. Position of Candidates Selected to the Scientists' Pool
(January 1, 1965)

Category	Then in India		Then Abroad		Total	
	Number	Percent	Number	Percent	Number	Percent
Did Not Join	494	23.6	199	17.1	693	21.3
Yet to Join	362	17.3	915	78.5	1277	39.2
Joined	1236	59.1	52	4.4	1288	39.5
Total Selected	2092	100.0	1166	100.0	3258	100.0

The following observations may now be made:

1) Less than one-third of the candidates who did not join found the inducement to return inadequate. These persons did not return to India. The rest did not join the Pool because they obtained regular employment on return. In this respect, the Pool offer served as an insurance against hardships of unemployment.

2) The significant size of the "yet to join" category appears to be the direct result of the practice of selection on an almost continuous basis. Almost 79 percent of the selected candidates abroad are in various stages of joining. A considerable proportion of this number is likely to return on completion of procedural formalities for entry to the Pool.

3) More than half of the candidates who returned have joined the Pool. The number of those who left the Pool to go abroad is by no means alarming, although the trend calls for close scrutiny.

An analysis of the direction of offtake from the Pool (Table III) indicates that over half of the Pool Officers have left the Pool on obtaining employment in the country. The majority of those remaining were working as Pool Officers.

Table III. Direction of Offtake from the Scientists' Pool
(January 1, 1965)

Category	Number	Percentage
Obtained Regular Employment in India	659	51.2
Appointed to Special Posts for Pool Leavers	10	0.8
Left for Abroad	52	4.0
Still Working in the Pool	562	43.7
Died	5	0.4
Total	1288	100.0

It will be seen from the foregoing that, within the ambit of its operation, the Indian experiment in voluntary repatriation of its high-level manpower has achieved significant success. At least three out of every five scientists selected to the Pool have returned. (If even 50 percent of those constituting the "yet to join" category return from abroad, the figure will improve to 75 percent.) An equal measure of success has, however, not been attained with respect to their absorption into regular employment. Broadly speaking, a little over 50 percent of the repatriated scientists have obtained regular employment in India. Most of the remaining scientists are still in the Pool, looking for suitable openings. The situation calls for a closer integration of the policy of voluntary repatriation of scientists abroad with the national manpower policy relating to optimum utilisation of scientific talents in the country.

Shortcomings notwithstanding, the Scientists' Pool Scheme has made considerable impact on the repatriation policy of some of the developing countries. It may be relevant, in this context, to refer to the Greek policy of repatriation of its competent scientists abroad, which has been influenced, in no small measure, by the Scientists' Pool Scheme. The Consultative Committee of Colombo Plan countries on Cooperative Economic Development in South and South East Asia, at its fifteenth meeting, held at Bangkok in 1963, commended the Scheme to other countries of the region for retaining "highly trained personnel within the country pending the availability of suitable job opportunities for them."

AN EXERCISE IN
VOLUNTARY REPATRIATION
IN GREECE

George V. Haniotis

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for Economic Cooperation and Development,
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These are
excerpts
from the
article.

The economic progress of Greece may be sufficiently illustrated for the present purposes by stating that, between 1951 and 1961, the gross national product increased at about 6 percent a year while trends in locally produced goods are toward greater variety and higher quality.

To achieve a rapid and sustained rate of economic growth in a developing country like Greece requires, in addition to capital needs, a highly sophisticated entrepreneurial and managerial class and highly qualified scientific and technical personnel if modern economic units of production are to function effectively. An inadequate supply of such skills in a developing economy and the inelasticity of their supply in the short run will impede any attempts by government to increase production in the vital sectors of economic activity and will discourage entrepreneurs from expanding or creating new productive capacity. In the past, foreign experts have often been made available to fill gaps in the supply of scientific and technical personnel which is a prerequisite to economic development, but it would be unrealistic to suppose that it would be possible or even desirable to continue this as a general practice indefinitely.

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The shortage of highly specialised scientific and technological skills occurs naturally at a certain stage of economic development. Even the most optimistic forecasts estimate that the Greek demand for scientific and technical personnel will still exceed the supply in the 1970s. The lack of adequate educational facilities — teaching and research personnel, equipment and physical facilities, scholarships and professional grants — sharply limits the number of candidates who can be accepted by existing domestic institutions, while outdated or insufficient curricula discourage many students, and especially the most outstanding, from pursuing studies at home. A large number of students, therefore, particularly those studying in fields vital to national economic interests, will attempt to obtain their higher education in foreign universities.

Number of Greek Students in Higher Educational Institutions
Abroad by Country and By Area of Study in 1961

Country	Number of Students	% Pursuing Studies in Science and Technology	% Pursuing Studies in Humanities and Social Sciences
Austria	2,450	70.9	29.1
Germany	2,138	60.9	39.1
Italy	1,428	63.9	36.4
United States	1,200	48.4	51.6
France	680	25.8	74.2
Switzerland	500	43.1	57.9
Others	508	51.0	49.0
Total	8,800	58.8	41.2

Source: Economic Planning Division, Greek Ministry of Coordination

Both the Organisation for Economic Cooperation and Development (OECD) and the Greek authorities recognise that the long-run solution for meeting this continuing demand lies in enlarging the facilities for domestic output of such personnel and in qualitative and quantitative improvements to faculties and curricula. To these ends, cooperative efforts have been launched, through the Mediterranean Regional Project of the OECD's Directorate for Scientific Affairs and through other joint projects and Greek governmental programmes, including plans for a third Greek university, a modern institution for high-level training in public administration, and so forth.

Students Abroad and Voluntary Repatriation

There is also, however, a short-run remedy which aims both to satisfy the immediate demands for scientific and technical personnel at the highest levels and to provide for the increases in high-calibre teaching faculty necessary to man the projected third university and to bring new life and vigour to the existing institutions for higher education. This remedy, jointly sponsored by the OECD and the Greek Government, is the new pilot programme for repatriating, on a temporary basis, a limited number of Greek scientists now working abroad who, at the completion of a contractual engagement with the Greek Government, would then be free to remain in Greece or to return to their foreign employment.

Greece has a reservoir of such highly qualified personnel if it can but be tapped. This reservoir is an extremely large one with rich and varied resources of talent. Approximately 24 percent of all higher level Greek students, or 8,800 students, were studying abroad in 1961, and 58.8 percent of these were pursuing studies in scientific and technical fields. Experience shows that many of these students remain past the period of their educational requirements to gain experience in research, teaching, industry, and/or administration.

Number of Greek Students Abroad as Percentage of Total
Greek Students in Higher Education by Type of Studies, 1961

Type of Studies	% Studying Abroad
Scientific and Technological Fields	33.2
Humanities and the Social Sciences	17.0
Percentage of all Greek Students	24.0

Source: Economic Planning Division, Greek Ministry of Coordination

This calls up a highly optimistic picture when the progressive impact of their accumulated knowledge and experience on the development of the nation's whole economy is considered. But do they return?

Many do return and do make decisive contributions, finding or forging the necessary conditions for personal and professional satisfactions at home or putting up with such local frustrations as cannot be altered. However, since shortages of highly trained manpower do exist, this is not enough. Many others return only to reapply for visas within a year or so, usually to the countries in which their studies were completed and/or their experience gained. Some simply stay abroad,

contributing to the total of emigrant remittances, but not their acquired skills. Others, domestically trained, are thus encouraged to emigrate also; and so a large part of the cream of the national intellectual resources is lost. The new generation of emigrants engages in research and in developing designs which are patented abroad.

No reliable figures are available as to exactly how many Greek scientists are lost in this way, but in fairness to them and in order to justify the repatriation programme which aims at salvaging at least a part of this outflow, some of the reasons why so many highly specialised persons choose to work abroad must be examined.

First, a certain number marry abroad, establishing social and family lives which are difficult to uproot. Nevertheless, professional and economic considerations are probably the primary incentives to persons of this calibre. It is quite understandable that a scientist, highly qualified in training and experience, engaging in remunerative work under good conditions, perhaps having achieved university tenure or some other sort of security, and certain to increase both his income and prestige in his present employment in one of the advanced countries, will be reluctant to return to Greece. There he may face employment at a level inferior to his capabilities or no employment, employment at a lesser salary or without assurance of permanency and increasing rewards and responsibilities, employment in closely held firms which precludes advancement to upper echelons of the hierarchy, employment in an atmosphere of intellectual stagnation, or under conditions degrading to someone of his professional standing, or devoid of essential equipment and simple efficiency.

Such an individual may also anticipate the possibility of being forced to the humiliation of having to seek "connections" to obtain a position rather than basing his claims to opportunities for hiring and promotion on professional criteria and past achievements. In a fairly large number of cases, the main deterrent seems to be that, having reached an age or a stage in professional or family circumstances where the fulfillment of an uncompleted military obligation in Greece would be of no benefit to the individual nor he to it, the rather unpromising laws concerning compulsory military service outweigh any other considerations.

While all of these problems — and others — have indeed been current in Greece, the extent to which they have been progressively eliminated is more significant. All political elements in Greece agree on the need for an enlarged, revitalised, and modernised educational system which can effectively serve and keep pace with the growing national economy as a whole as well as with the increasing demands of the public. Both the private and public sectors have heavily increased their demands for specialised manpower trained abroad, and growing

numbers of high-level positions carrying both prestige and opportunities for real achievements are available.

Inducements to Return

The Directorate for Scientific Affairs of the OECD, having assisted its Mediterranean member countries in assessing their future needs for scientific and technological personnel in relation to their economic development objectives, is now cooperating with them to devise possible ways and means by which such needs can be satisfied. The Greek repatriation scheme is one pilot effort in this direction.

The purpose of this initial programme is not to induce repatriation on a wholesale basis in the beginning, but rather to persuade a limited number of Greek scientists and technologists now working abroad to return under a two-year contract to participate in the nation's development efforts. During this first effort, the OECD will assist in the initial contracts with applicants for repatriation; in planning to ensure the most constructive utilisation of their individual capabilities; to encourage the further use of such persons by government, education, and industry; to stimulate increased research cooperation between industry and scholars, etc.

The difficulties involved in such an effort are numerous, but on the basis of experience gleaned from repatriation efforts elsewhere (e.g., in India) and the interest shown in the scheme to date, the pilot programme is expected to show positive results. Responses to date indicate a fairly high degree of interest, and it appears that the initial group can be selected from applicants of extremely high calibre. Whether the Greek Government will be successful in utilising the various abilities of these individuals for a lasting contribution to the development effort, in providing them with real inducements to remain in Greece, and in continuing to attract others to return in future programmes, of course, remains to be seen.

What does the programme offer the individual scientist, that he should be tempted to leave his padded, adjustable, contour desk-chair for the uncertainties of such a pioneer programme?

A large number of those Greeks working abroad are eager to return permanently and will probably do so under the security of the trial basis which this scheme provides, its paid expenses and guaranteed two-year income, since no obligations exist beyond the period of the contract.

Others may feel permanently settled in their adopted countries and yet be tempted to consider the two-year programme from such considerations as the opportunity to renew family ties, to introduce foreign-

born wives and children to Greece and Greek culture, the opportunity to study the effects of change in Greece at first-hand, the beneficial effects of climate, etc.

Some other benefits which, it is hoped, will prove tempting are the relatively higher living standards available in Athens at the salary levels provided by these contracts, the entertainment and social facilities which may have been lacking to those coming from small university communities where such advantages are often both limited and expensive, the opportunity to educate children in Greek-, English-, French-, or German-language schools, and the lower cost of medical and dental care and other services.

Not the least of the rewards to which an individual may look forward under this scheme will be the satisfaction of contributing something of lasting value and the pride of being one of a chosen few rather than one of an accepted many.

If the pilot programme for repatriation of scientific and technological personnel in Greece is as successful as it is hoped it will be, valuable experience will be gained which will be of service to other nations facing similar manpower shortages and having similar supplies of manpower abroad. Knowledge will be accumulated in helping the less developed countries as their problems of underdevelopment give way in turn to problems of development.

EMIGRATION OF SCHOLARS AND
THE DEVELOPMENT OF TAIWAN:
CHINESE-AMERICAN COOPERATION

Joseph B. Platt

[From a paper presented to the panel on
science policy for development at the
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Washington (D. C.), 12 March 1965.]

These are
excerpts
from the
paper.

The Republic of China has produced, and continues to produce, pure scientists of the first rank. Two of the postwar Nobel Laureates in physics in the United States had their undergraduate education in the Republic of China, while on the mainland. However, there are very few scientists of senior stature involved in pure research in Taiwan, because this is just not a luxury the economy has been able to afford to date. Most of those trained in Taiwan and abroad, who are involved in pure research, are in the United States.

The recent economic growth of the Republic of China has been spectacular, but each successful step means that the next phase of economic development must be just that much more sophisticated. A great deal of applied science has gone into the agricultural development of Taiwan, and the industrial development to date has drawn heavily on applied science. The next phase, however, calls for a higher level of technology in both spheres.

Economic development in any developing country must pass through successive phases of complexities.

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Hence, it is important to understand how a country with still very limited resources can concentrate on making a few breakthroughs into advanced technology competitive on the world market with the more highly industrialized nations.

The Academia Sinica of China and the United States National Academy of Sciences are engaged in a cooperative effort to confront these problems. On the Chinese side, the Academia Sinica is making an inventory of the research and development currently underway in Taiwan including personnel, equipment, and fields of interest. Since the Republic of China is very short of senior scientific personnel, the United States National Academy of Sciences agreed to make a sample survey of scientists of Chinese origin currently employed in the United States who might be interested in returning to the Republic of China for an assignment of short or longer duration.

The Republic of China has universal primary education, and approximately 40 percent of the graduates from primary education move on through a secondary education. Of the high school graduates, a little less than 40 percent are admitted to the universities and colleges so that approximately 15 percent of the total college-age group of Taiwan are, in fact, university or college students. The best of the graduates, academically, are granted scholarships for study abroad, either by the Government or by foreign graduate schools. Currently, about 2,000 per year are leaving for graduate study abroad. Furthermore, most stay there. The number who return to Taiwan after completing their graduate studies abroad is uncertain, but it is around 5 percent. The net outcome of the training, then, of the ablest of the young people on Taiwan is to provide scientific and technical manpower for other countries, primarily the United States.

This loss of talent presents a critical problem. One can understand the reasons for the failure to return. The young man with a Ph.D. joining the faculty of a university in Taiwan receives a salary of from US\$ 50 to 100 per month, including all the fringe benefits. He can command about five times that salary in Hong Kong or Singapore or ten times that salary in the United States. Furthermore, in the United States he has equipment and colleagues and consequently can stay in contact with the most recent developments in his chosen field of study. In China, however, if he is to get a salary in the upper range I mentioned, he will hold at least two jobs and teach perhaps 18 hours a week. He may, in fact, be hired in the civilian sector of the economy on Taiwan at salaries at least three times the salary he would receive as a civil servant.

Under these circumstances, the Chinese find it very difficult even to retain scholars in the areas for which they have unique research facilities. In the field of Chinese philology or Chinese literature, for

example, the national treasures of the Republic of China do provide superb research materials. Yet National Taiwan University finds it difficult to retain a scholar capable of teaching Chinese philology or Chinese literature on the graduate level. He can command too high a salary teaching even elementary Chinese to beginning language students in the United States.

Effects on the Development Effort

This loss of the cream of the talent in the sciences presents a critical problem for the effort to develop the Chinese economy. In the first place, these people are needed to maintain the educational system itself. Without some graduate work in the natural sciences, the level of the undergraduate teaching in these areas will gradually deteriorate, and the training of agronomists, medical doctors, and engineers will suffer. If the instruction at the collegiate level in the basic sciences is not strong, instruction in the schools in mathematics, biology, chemistry, and physics will, in due course, suffer, to the very considerable disadvantage of students who are to become dental technicians, rural health workers, plumbers, and manufacturing employees. In the educational pyramid, each person at a particular level of training is responsible for the education and continuing growth of several people at the next lower level. Some part of the normal university production at the doctoral level is needed, at present, just to maintain, and hopefully to raise, the general standard of education.

Secondly, there is an immediate industrial demand for trained people, who are very hard to find. Taiwan now has the beginnings of an electronics industry, but much of the work in that industry consists of assembling components for foreign corporations that provide the designs, the quality control, and the marketing. At present, Taiwan is short of skills in electronics design, in quality control, and in marketing that are needed to compete in the world market. These are graduate-level skills and, while the Institute of Electronics of National Chiao Tung University is beginning to supply the required people at the masters level, there is quite a distance yet to go. The particular example of electronics is by no means unique. Petrochemicals, synthetic fibers, and plastics are areas in which Taiwan hopes to expand its industrial base, and each of these calls for a limited number of people of high technical competence in design, development, and quality control. Taiwan hopes to expand its metals production and metal fabrication. Likewise, a good deal more could be done with food processing for export. In each of these areas, the availability of a limited number of people at the doctoral level of competence is necessary for effective competition on the international market.

The conclusion, then, is that Taiwan could probably mobilize its available technical resources somewhat more effectively, but that there

is a more basic and continuing problem of attracting and retaining a larger fraction of the people of high technical competence now lost to overseas jobs.

Attempts to Remedy the Situation

The primary progress on the Chinese side is that plans are now in hand for five centers for research and graduate study in Taiwan. These centers are to be in engineering, mathematics, physics, chemistry, and biology. In general, these centers are not to be created anew, but are to be consolidated from existing resources of manpower and facilities in the Republic of China. To these will be added new faculty members, two or three to each center, free from most of the burden of undergraduate teaching and with time and competence to direct research activities at the graduate level. The salaries established for these new posts are not sufficient to compete in the overseas market, but should provide a comfortable living and freedom from the necessity to take a second job at night. This marks a bold beginning in establishing graduate study and research on a level that would attract and retain good people. It is still a marginal attempt, because the immediate need is to attract back to Taiwan, at least for a period of some years, enough graduate faculty to begin to create the next generation of graduate teachers and research workers on the island. To live comfortably while in Taiwan is not enough, because most of the people who are needed have dollar costs that must be made good in the United States if such an assignment is to be undertaken without a great deal of personal self-sacrifice.

The United States National Academy of Sciences has completed a poll of some 1,000 scientists and engineers of Chinese extraction now employed in the United States. About 500 of these people have indicated a willingness to go to Taiwan for a period of service. It appears that, if the conditions can be made sufficiently attractive, there is interest and willingness in helping to establish graduate study on Taiwan by faculty members currently at major universities in the United States, and by scientists and engineers on the staffs of industrial and other research institutions.

Over the next year, our Chinese colleagues will establish a small steering committee for each of the proposed centers. In the United States, we will establish a small group of consultants for each of these centers in the hope that these scientists and engineers from the United States may be of some help in planning the programs of the proposed centers and in recruiting people who might return to help get them started. The Ministry of Education expects to begin work in building these centers, so that there will be work going on even while planning is still being completed.

It is much too early to say what the ultimate result of this cooperation will be. We hope, as a first step, that it will be possible to get some graduate work going in the areas of particular importance to the Chinese economy during the remainder of this decade. The purpose of this is, in part, to produce applied scientists on the island of Taiwan, but also to make the professional situation sufficiently attractive on the island so that an increasing fraction of the available Chinese engineers, scientists, and scholars will return. If one in four of the ablest young people were to return, rather than one in 20, the economic future of Taiwan would look considerably brighter over the remainder of this century. In essence, what the Government of the Republic of China hopes to do is to create a sufficiently attractive situation for the ablest of its scientifically inclined young people, so that there will be a valid professional career for them on the island. As Dr. LI Chi puts it, "At the moment, the only real choice they have, if they wish to practice their profession, is to leave Taiwan. We would like some of these people to help us build the Chinese economy in Taiwan and to maintain the continuity of our cultural tradition when we, who are old men, are gone."

HOUSING AND DEVELOPMENT

Housing has been called the step-child of economic development. Post World War II reconstruction experience in Europe and in Russia showed that housing investment could be deferred and that people could put up with crowded housing while scarce capital and construction resources were concentrated or rebuilding industry. Housing projects normally require that large amounts of capital be invested in a short time and, taking rents as output, the capital-output ratio is high.

Just as there has been a recent shift of emphasis in development circles to appreciation for social overhead projects, the narrow view of the benefits from housing has been questioned. This trend is evident in the first selection by Leland BURNS. He then presents results of a case study of the effects of improved housing on productivity, education, and health.

Whether or not the narrow view of its benefits is accepted, the proponents of housing point out that economic development is concerned with human welfare, of which housing is certainly an important component. Stress, therefore, has been on aiding self-help housing, where the future resident provides most of the labor and capital costs are reduced to a minimum. Cooperative ventures are favored because members provide the investments from their own savings. The role of cooperative housing and the operation of the Maipú cooperative in Chile are studied by Samuel RUIZ Luján.

We have provided some pictures of housing constructed in low-income countries under local programs, by housing cooperatives, and with the support of the Social Progress Fund of the Inter-American Development Bank.

ECONOMIC ANALYSIS OF HOUSING PROGRAMS FOR DEVELOPING COUNTRIES

Leland S. Burns

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These are
exceprts
from the
paper.

Housing is one of several unwanted step-children in many contemporary programs of economic development. Its justification as a component of development programs is based on grounds of social necessity or political expediency, or as an essential for shelter to accompany industrial development. The social argument is generally supported by a list of evils attendant to conditions of overcrowding or dilapidation to which market forces fail to respond. Such conditions, it is also argued, are fertile grounds for breeding political ferment and civil strife. Pricing the social and political costs and risks is a difficult task, often leading to results of doubtful validity. Development planners aware of these methodological problems are likely to accept housing as an ingredient of an overhead program, justified in terms of social welfare or "need" rather than on the basis of strictly economic criteria.

To date, the application of traditional tools of investment scheduling, such as capital-output ratios, have accorded social overhead projects, such as

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housing programs, low positions in development schemes. With a high capital-output ratio estimated (for the U.S.) at 7.1, housing can scarcely compete for limited capital resources with alternative ratios running as low as 3.2 for railroad transportation and 1.6 for iron mining. As a consequence, heavy industry, projects in transport and power, and other alternatives yielding quicker and more readily measured payoffs have preempted the high ranks on investment priority lists. In this context, capital allocations to residential construction have been based on the need for worker housing merely as a necessary element of industrial growth, rather than one recognized as contributing directly to growth.

This paper presents a framework, structured on economic criteria, for allocating capital to housing, and considers the effects of housing investment on income and output, employment, prices, the balance of payments, and sub-national migration. Many questions are raised by implication and few are answered explicitly, yet the considerations outlined are the sort that must be taken into account in systematic planning for the growth and development of emerging nations. The framework proposes reclassifying housing as a tool for economic development rather than as a political or social welfare target.

Several initial assumptions are in order. First, maximum increase in real income over time is set as the primary target of economic development. Second, the direct returns generated from investment in housing are chiefly in the form of interest charges and rents, actual and imputed. Third, to facilitate the development of the rationale proposed in this paper, the capital-output ratio for housing is assumed to remain constant regardless of the investment decision. Finally, it must be assumed that capital resources are available for investment in limited quantity, and that an increase in investment in any one sector is at the expense of another.

Considering housing as a tool for economic growth and development, rather than as a target strictly of social or political policy, requires tracing through the linkages between improvements in the quality of housing and hypothesized increases in national income or product. Specifically called for is empirical testing of an important hypothesis: that investment in housing contributes to economic growth by increasing productivity through improved living conditions. The precise linkages between the investment and output are subtle and complex, but may be reduced to two interrelated basics: the physiological and psychological response to a changed living environment.

Housing and Health

Clear and ample evidence is available of the association between inferior housing and the incidence of disease, malnutrition, and other

medical ills. Although it is uncertain whether poor housing is a causal or a reinforcing factor for poor health and disease, as well as for social disorder and disorganization, the correlations are impressively high and positive. Most studies of these relationships have been confined to the more developed nations. Yet it may also be argued that, with the decidedly inferior housing conditions prevailing in the poorer nations, the correlations between similar indices are even more compelling. Further, a small improvement in housing quality may elicit a greater response than an identical improvement in a wealthier country. Investment in new residential construction which raises housing standards on balance not only lowers many of the social costs of providing public services, but also reduces absenteeism and, by so doing, generates greater productive capacity in the labor force.

While it is abundantly clear that reduced absenteeism leads to increased output under conditions of full employment, the case is less clear where unemployment and underemployment are the rule. In the latter instance, which is typical for labor in underdeveloped countries, it may be reasoned that the unemployed will be hired to replace hours lost from absenteeism without impairing output. However, the substitution of newly hired labor, requiring training and tooling-up time, is less productive than keeping the trained labor forces on the job. Consequently, the "trade-off" is not equal and the case for providing housing as a retardant to absenteeism is strengthened. The same reasoning applies to the provision of permanent residential accommodations for a labor force accustomed to returning periodically to family homes separated by considerable distance from the work site. If such "pilgrimages" are temporally random, the labor force can be augmented accordingly. If not, then the provision of company housing offers a possibility for increasing temporal permanence and reducing the costs associated with an unstable labor force.

Psychological Effects on Output

The second linkage is the psychological connection between output and living conditions. Again, a substantial literature has emerged demonstrating the effect on worker productivity of various types of living environments (at home and at work). This reaction is evidenced by higher morale, improved work discipline, and increased ambition, all of which translate into increased output on the job. To the extent that better housing improves living conditions, thence employee attitudes, the benefits may be traced back to the cost of the housing program.

If the benefits attributed to housing are more than illusory, then the benefits, in effect, accrue to the economy in general rather than to housing in particular. More precisely, by increasing output, housing investment reduces the capital-output ratio of the economy's

non-housing sector. This logic, taken with the initial set of assumptions, leads to a theoretical decision rule governing the allocation of capital between housing and all other sectors. Investment in housing is justified so long as the additions to output it generates exceed additions attributable to all other investments taken in the aggregate. The optimal division of capital occurs at the point where the marginal contribution of housing investments to total income equals the decrease in contribution of the non-housing sector resulting from an incremental investment in housing. This rule recasts housing in an economic framework where a high capital-output ratio alone does not relegate it to a necessarily inferior position in the competition for scarce capital.

Price-Level and Balance-of-Payments Effects

The implementation of this decision rule assumes that the optimal distribution of capital between housing and non-housing is determined by relative impacts on income or product. At least two other effects are immediately relevant to national economic targets: the impacts on the level of prices and on the balance of payments. While each is difficult to discuss in general terms due to unique circumstances in individual countries, issues can be raised to elicit responses for guiding policy.

The investment mix between housing and non-housing will bear differently on price levels depending on resource endowments. Relative scarcities in terms of sufficiently skilled labor for the construction sector, or of building materials of the proper type, will exert pressure on price levels. As a rule, the residential construction industry in many underdeveloped countries utilizes relatively low skills where transfers from other types of employment are accomplished with comparative ease and without requiring the payment of necessarily higher-than-average wages. "Self-help housing," for instance, involves inputs of labor with only minimal skills. Inventories also indicate that indigenous materials, often of a very primitive nature, can be mobilized cheaply for house building. Still, the finding that residential construction is inflationary relative to non-housing calls for imposing a restriction on the decision rule. Such a constraint would operate to modify the optimal mix according to the inflationary pressures created by the mix as well as the amount of inflation tolerated.

Balance-of-payments considerations are closely allied. A "tolerable" level of price increases must take account of secondary effects on the demand for exports. From domestic price increases follow deteriorating trade positions, other things being equal, as domestic production fares less well in the competition for world trade shares. Consequently, alternative investments must be reckoned in terms of the world response, as well as domestic reaction, to increased prices.

Distribution of Housing Investment

While the major distributional problem concerns the division of investment between housing and non-housing, other distributional considerations are no less relevant. These questions relate to where housing is built and for whom. Considerations affecting the location of new housing and the nature of its occupancy may rest on objectives other than strictly economic, but still highly interdependent with primary economic targets.

Experience has demonstrated the power of housing for attracting labor into particularly "critical" occupations. In similar fashion, with productivity changes the major criterion, occupancy priorities for new quarters may be predicated on labor-capital ratios, with first preference assigned where the proportion is highest and changes in productivity are measured most readily. Similar rules may govern workers employed in export industries in order to stimulate the growth of foreign trade. Still other criteria may also influence the arrangement of occupancy schedules.

The distribution of housing among a nation's regions has important implications for rates of urbanization and industrialization, and their counterparts, the mobility of labor and capital. The problems associated with cities, growing as a result of rural-urban migration, are well documented. Programs calling for spatial decentralization of new housing and community facilities can serve to encourage stability and discourage urbanization as well as reduce the inefficiencies of congestion and the higher social and economic costs of cities expanded beyond optimal size.

In the same context, housing may provide incentive for the decentralization of industry, a goal pursued in the regional development programs of many developed and underdeveloped countries. Providing more adequate shelter in less urbanized places may attract industry as well as rechannel the migration of labor. A complementary policy for housing would facilitate the development of new towns in areas with economic potential. One potential would be a labor pool qualified for employment by industries seeking locations for new plants at diversified points.

Conclusion

Many other components of decisions concerning housing investment could be mentioned. For example: the productivity of the house-building industry itself, the impact of new residential construction on tax bases, home ownership as a device for stimulating a reservoir of savings, the role of financial institutions in financing housing, and the price distribution of housing among income groups. Further

alternatives to the criterion of productivity or to the assumed target of maximum economic growth have been omitted.

In sum, the framework proposed here for analyzing the position of housing in economic development demonstrates the need for an examination of the relative productivity of housing. In strict terms, housing is warranted when it makes a measurable contribution to output in excess of alternate investments. Such a contribution is measured by the change in alternative output rates attributable to an investment in new residential construction. Making the necessary measurements for developing this framework is a formidable task indeed, but one that must be undertaken if housing is to make its bid for capital resources on the basis of economic criteria.

COST-BENEFIT ANALYSIS OF A HOUSING PROJECT

Leland S. Burns

[From "Cost-Benefit Analysis of a Social Overhead Project for Regional Development," a paper presented to the Fifth European Congress of the Regional Science Association, sponsored by the Polish Academy of Sciences, Krakow, Poland, 30 August - 2 September 1965. Full proceedings will soon be published as Papers, Regional Science Association, 1966, Volume XVI, available from the Regional Science Association, Wharton School, University of Pennsylvania, Philadelphia (Pa.).]

Excerpts
from the
paper begin
on the
following
page.

[While the following study was carried out in an underdeveloped section of a high-income country, the approach should be of interest to planners everywhere. The specific figures, however, may be expected to reflect local conditions.

Some of the similar case studies in six low-income countries now being undertaken by the author and his associates are supported by the research program of the Agency for International Development; some are financed by local interests.]

By nearly any social or economic criterion, the Pine Ridge Indian Reservation, located in the mid-western United States, classifies as one of the most backward regions in the nation. The Reservation is officially designated for government assistance in the form of grants and loans under terms of the 1961 Area Redevelopment Act, the principal federal program for regional development. Notwithstanding such efforts to stimulate regional growth, little has changed at Pine Ridge with the exception of a highly labor-intensive, minimally capitalized factory which located on the Reservation in 1961, and a federally sponsored housing project. The factory employs approximately 400 workers during peak seasons and the portion of the housing project under consideration consisted of 50 units completed and occupied in mid-1963. Our concern will be the feasibility of the housing project.

The Costs and Benefits of Improved Housing

The benefits isolated for measurement are: (1) improved productivity, hence earnings, via increased motivation and decreased absenteeism of the rehoused work force, (2) improved school attendance with its deferred impact on income, (3) improved health with lower costs of medical care, and (4) income to the sponsoring agency in the form of rents. Other benefits with positive or negative effects on regional growth are undoubtedly relevant, but these four major types are paramount in this case.

The environment was ideally suited for an analysis of changes attributable to housing. First, the investment was made in isolation. Second, the improvement in living conditions was sudden and substantial. Third, the area was socially, economically, and geographically separate from the rest of contemporary America. Finally, the labor intensity of the production process, the homogeneity of skills employed and of product produced, and the existence of the factory prior to the housing improvement facilitated before-and-after comparisons of productivity.

Several simplifying assumptions are in order. First, full employment is assumed for the skill level considered in this analysis; hence, an increase in the number of hours worked has no effect on the number of persons employed. Second, the demand for final product responds to increases in supply without affecting the price per unit. Third, production increases require no additional capital investment. Fourth, the element of federal subsidy in rents and medical services is balanced by a lower cost of capital.

Benefits deriving from the investment in housing were separately valued as differences between expected and actual levels after rehousing the labor force. An expected level was defined as the quantity which would have obtained if rehousing had not occurred. For the

estimation of health and education benefits, the expected level was calculated as the change in level after rehousing if behavior over the same time period had paralleled a control group of families not rehoused. Because a control group was not available for measuring production benefits, the expected level was obtained by extrapolating into the post-rehousing period the test group's before-rehousing performance. The expected level after rehousing thus reflected the learning curve; that is, the output over time as the worker became increasingly familiar with his work task. The before-and-after measures were taken as average outputs for the half-year preceding and the half-year following rehousing. The other benefits were calculated from a year's experience on either side of the relocation date.

Benefits must be measured in money units if they are to be compared to the capital investment from which they spring. For production, the benefit was the increase in wages obtained from the difference between actual and expected output levels. Health benefits were savings in the cost of medical care for in-patient (hospital) and out-patient (clinical) admissions. Educational benefits were measured as the discounted incremental future income streams the better educated would command upon entering the labor force. Because reduced absenteeism from school increases exposure to education, each day of absence involves a cost in the form of reduced earnings during later employment. The value of a day's education was obtained from Houthakker's estimates of the marginal value of a year of primary-level education. Finally, the direct benefits, or the returns normally attributed to housing investment, were simply the rents paid by rehoused families to the investor, in this case, the U. S. Public Housing Administration.

The differences in level, and the annual values of each of the benefits per household, are summarized in the table. The difference between the last two columns takes account of the number of persons in the household to whom the benefit accrues. The distribution of estimated benefits demonstrates that the returns normally imputed to housing investment — rents of \$672 per unit — amounted to less than half (40 percent) of total benefits. The more elusive indirect benefits, or external economies, including output increases, related primarily to health improvements. Reduced absenteeism from work, which accounted for the bulk of increased production, and absenteeism from school, can be attributed largely, if not entirely, to improvements in sanitation, privacy, and occupancy intensity afforded by the new, higher-quality dwellings.

The appropriate interest rate for discounting the annual benefits stream was obtained as the cost of capital to the financing agency during the year of appropriation (3.66 percent) plus an arbitrary margin for general overhead not included in operating charges (0.5 percent). The estimated life of the asset is about 60 years, or nearly the

equivalent of perpetuity for discounting purposes. The present value of the benefits stream is simply total annual benefits (\$1,680) divided by the discount rate (4.16 percent), or \$40,340 per dwelling.

Cost per housing unit consisted of capital charges (\$15,560), plus annual operating charges (\$600) at their present value (\$14,425), or \$29,985.

Therefore, the benefit-cost ratio is 1.35.

If the capitalization rate seems conservative, it must be realized that medical costs and rents are both below market levels by the margin of federal subsidies. Thus, as assumed, the subsidy element on both the benefit and the cost sides may cancel, leaving the ratio unaffected. Further, the ratio would exceed unity for any interest rate up to 6.9 percent. Under the circumstances given or assumed in this case study, housing ranks as an attractive investment for regional development programs.

Summary of Annual Benefits Generated Per Housing Unit

	Actual Before Rehousing	After Rehousing			Annual Value of Benefit	
		Actual	Ex- pected	Differ- ence	Per Individual	Per Household
Rents						\$672
Production Output per hour (gross)	2.3	2.7	2.8	-0.1		
Work per week (hours)	31.2	33.1	29.8	3.3		
Production per week (gross)	72.1	87.1	82.4	4.7	\$526.00	737
Health						
In-patient visits	.31	.12	.21	-0.09		
Out-patient visits	2.62	2.87	3.36	-0.49		
Total visits	2.93	2.99	3.57	-0.58	30.50	229
Education						
Days absent	11.0	9.18	9.54	-0.36	15.00	42
Total					\$571.50	\$1,680

The research summarized here is unique in several respects. First, it removes housing policy from the usual context of social development and recasts it in an economic framework. Second, the analysis draws on historical behavior in contrast to the projection of assumed future behavior customary in cost-benefit analyses. Third, it examines and measures the benefits of housing, a form of investment with which cost-benefit analysis has rarely been identified.

A COOPERATIVE APPROACH TO
HOUSING PROBLEMS IN LATIN AMERICA:
THE EXAMPLE OF CHILE

Samuel Ruíz Luján

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These are
excerpts
from the
article.

The housing problem is by no means peculiar to the developing countries, since it also affects the industrialised countries to a greater or lesser degree. But, it is a fact that the problem is extremely serious in the developing areas of the world, and Latin America is among those where it is worst.

One of the chief reasons for this is the high rate of population growth. It is calculated that, if the present rate of population increase continues, the urban population of Latin America will have increased by approximately 100 million by 1975 and the rural population by about 20 million. When it is also borne in mind that much of the present stock of housing, especially in the rural areas, is antiquated, inadequate, and lacking in the most elementary sanitation, the sheer magnitude of the housing problem facing Latin America and the need for energetic measures to overcome it can readily be appreciated.

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Housing Cooperatives in Latin America

Housing cooperatives are certainly not the only or even the easiest way of solving the shortage. Nevertheless, they have great potentialities which, if properly used, can do much to help to overcome the problem in Latin America.

Some of the advantages offered by housing cooperatives in the countries where the movement is most highly developed are as follows:

(1) they stimulate initiative and a spirit of mutual help, and encourage people to tackle their own housing problems by giving them an opportunity of joining in a combined effort instead of depending entirely on outside help;

(2) they reduce or stabilise prices by eliminating all the middlemen who speculate on the housing market at every stage;

(3) they make it easier to obtain loans on reasonable terms, since a specialised association with recognised legal status is much better placed to do so than an individual;

(4) they can undertake house building in volume and buy their building materials wholesale;

(5) they can set up their own factories;

(6) they can provide additional economic, cultural, and recreational facilities as an integral part of their housing schemes, and can help to establish new communities in which people get to know each other better through these cooperative activities.

Housing cooperatives occupy only fourth place in the Latin American cooperative movement, the first three (in terms of membership) being filled by the consumer, the credit, and the farm cooperatives. It should be added that many of the cooperatives organised for housing purposes have not been genuine housing cooperatives at all, but house-building cooperatives; some of these have been wound up as soon as the building was completed, though others have continued to provide their members with community facilities. The two Latin American countries with the greatest achievements to their credit in the field of cooperative housing are Colombia and Chile. But, as the table shows, there are countries in which housing cooperatives are only in their infancy and even some where there are, as yet, apparently none at all.

HOUSING COOPERATIVES IN LATIN AMERICA (July 1963)

Number of cooperatives		Number of members	Number of cooperatives		Number of members
Latin					
America		149,636	Guatemala	4	250
Argentina	94	25,678	Honduras	4	177
Bolivia	4	176	Nicaragua	5	460
Chile	374	43,600	Panama	1	20
Colombia	n. a.	59,494	Peru	84	8,849
Costa Rica	4	349	Puerto Rico	34	3,300
Ecuador	94	6,389	Venezuela	4	894

Adapted from The Cooperative League of the U. S. A. : Desarrollo de las cooperativas en América latina (San Juan, Puerto Rico, 1963).

The figure for Colombia includes members of housing sections of multipurpose cooperatives.

The cooperative formula, as one way of dealing with the housing problem, is widely accepted in the Latin American countries, despite a few isolated failures which might have been avoided if there had been adequate technical help and better financial facilities. There is, in fact, much that the cooperative system can do to help overcome the housing shortage. Not only can it make housing available on reasonable terms for families in the lower-income brackets but it also can help to create a social environment which is favourable to other forms of co-operation that benefit the community as a whole.

The Chilean experiment in cooperative housing has a number of interesting achievements to its credit which deserve close consideration in view of the magnitude of the housing problem in Latin America.

The Cooperative Experiment in Chile

Of all of the different types of cooperatives in Chile, those dealing with housing are the most recent in origin. Yet they have spread so quickly that, within a few years, they have become the most flourishing section of the movement and account for 37 percent of the total number of cooperatives in that country.

Nevertheless, the origins of the Chilean cooperative housing movement were distinctly modest. The first societies were set up toward the end of 1949. Initially, they were formed spontaneously by groups of clerical and manual workers who were impelled by a common

interest — their need for housing — and encouraged by the early successes of the consumer cooperative movement. Usually, the members of these early societies were employees of industrial firms. Their societies were formed to finance the building of homes for their members and were, in effect, an experimental attempt to accumulate the necessary capital. In those days, there was no technical or financial help from the Government. Furthermore, the cooperatives had no qualified staff and — worse still — the members had no cooperative education. Inevitably, they achieved only a limited success, but the lessons of these first experiments were borne in mind when housing cooperatives later began to spread through the country. The cooperative housing movement, which initially tended to be concentrated in the city of Santiago, has progressively spread through the provinces, and has grown remarkably between 1959 and 1963.

Two main factors explain the development of the Chilean cooperative housing movement: the interest of the public and the aid given by the Government to low-cost housing schemes as a matter of national policy.

Housing policy in Chile, which dates only from 1959, has resulted in a series of measures which have proved their worth in encouraging house building for families in the lower-income groups. The housing cooperatives, which had hitherto operated on a very small scale because they were carrying out their projects at a time when the value of money was falling sharply and without the technical and financial help they needed, joined in the Government's housing plan and so helped to give a decisive fresh impetus to the cooperative housing movement.

The Government's housing plan includes the following measures:

- (a) introduction of "index savings" and "housing savings accounts";
- (b) merger of the bodies engaged in planning and house building to form a single Housing Corporation to streamline investments and methods and to cut overheads;
- (c) granting the Housing Corporation the resources and powers needed to carry out its task;
- (d) establishment of a Planning and Economic Research Department to lay down procedures and standards for carrying out the plan;
- (e) introduction of new legislation on housing for farm workers, whereby a special levy is imposed on agricultural profits;
- (f) regulation of indexed loans granted by the Housing Corporation and provident associations to occupants of new housing, and levying of a sales tax to provide funds for workers' housing.

The Housing Corporation, through its Cooperative Department, has provided large-scale credit facilities for cooperative societies, mainly by granting mortgage loans and negotiating savings and loans agreements covering both site preparation and house building.

Federation of housing cooperatives. At first, the housing cooperatives in Chile were completely independent of each other and each society had to tackle, on its own, an undertaking involving complex problems of planning, organisation, finance, land purchase, site preparation, materials supply, construction, and management without having an opportunity to benefit by the lessons of earlier experiments. The need to band together to cope with the multifarious problems facing them became increasingly apparent and led the societies in existence in 1958 to form the Housing Cooperatives Federation.

Nevertheless, this was not a federation for business purposes. Its principal aims were to promote cooperative education, to explore ways and means whereby societies could supply each other with technical help, and to act as spokesman for them.

Auxiliary bodies. Auxiliary bodies have been set up by law to provide the housing cooperatives with technical help; their task is to perform technical, financial, or social services required by cooperative societies, federations, unions, and confederations.

One of these auxiliary societies is TECNICOOP, a company formed by the Chilean Housing Cooperatives Federation, the People's Housing Institute, the Chilean Building Association, and other organisations.

The aim of the founders of TECNICOOP was to lower house-building costs to the greatest extent possible. To this end, it provides technical aid to member societies at all stages of their schemes, i.e., planning, land purchase, site preparation, financing, and construction.

TECNICOOP serves cooperatives by:

- (a) explaining to groups of individuals who are thinking of forming a co-operative what they can expect from this method of dealing with their housing problems and what their contribution would have to be to achieve their object;
- (b) helping in the selection of the architect;
- (c) giving advice on ways of obtaining the necessary finance;
- (d) helping to select the best competitive bid for the prescribed standard of quality, work, and materials;
- (e) assisting in carrying out all the legal formalities;
- (f) supervising negotiation of the contract and the building operations themselves until completion;
- (g) giving guidance on the settling in of the families, and the provision and management of suitable communal services.

For this assistance, it charges 2 percent of the mortgage.

Since 1959, there has been another technical body of this type operating on a nonprofit basis, viz., INVICA, or the Caritas Peoples' Housing Institute (a Catholic institution), which makes its experience and technical advice available in the following ways:

- (a) by giving comprehensive specialist assistance at cost to individuals or groups of individuals, especially if they are interested in forming themselves into a cooperative;
- (b) by making plans, having regard to what the individuals concerned can afford and their ability to obtain finance;
- (c) by helping with the social, legal, and technical questions which arise after the housing is handed over for occupancy;
- (d) by encouraging small savers to take part in housing cooperatives;
- (e) by promoting the mass building of housing so as to cut the cost to cooperative members;
- (f) by handling most of the technical and financial problems on behalf of the cooperatives.

Finance. Under Chilean housing policy, the factor which has done most to promote cooperative housing in the last few years has been the availability of credit. The Housing Corporation, the body responsible for carrying out this policy, also operates the greater part of the credit scheme which is financed out of public funds, small savings, contributions from private business, and repayments on its own loans.

The Corporation's credit policy toward cooperatives is handled by the Cooperative Department, which confines itself strictly to the credit aspects, and by regional offices. The Corporation gives financial assistance to cooperatives either by granting direct loans or by concluding savings and loans agreements.

During the first four years of the housing plan's operation, the Corporation made direct loans to 32 cooperative societies against mortgages on their land. These loans were used to build 1,678 low-cost houses and to prepare 472 building sites.

Under the savings and loans agreements programme, any person (or association) can conclude an agreement whereby, after payment of contributions for between one and 15 years — depending on the terms of the agreement — he (or it) becomes entitled to a further loan, in addition to the accumulated savings, to enable housing to be built. Co-operative societies are covered by a special scheme with minimum requirements as to savings, depending on the cost of site preparation or building and the number of years during which savings are to be accumulated.

During the first four years of the plan's operation, the Corporation negotiated agreements with cooperative societies as follows: 23 for the

preparation of 3,015 sites, 17 for the construction of 1,263 dwellings, and four for the preparation of 265 sites and the building of dwellings on them.

In addition, many cooperatives have financed their schemes through the INVICA savings and loans programme, which, up to 15 September 1963, had assisted 212 societies with a membership of 17,963 families.

History of a Housing Cooperative

A study published recently by the Pan American Union (Las cooperativas como método de desarrollo de regiones y comunidades, Estudios y monografías, XIV [Washington, D. C., 1964.]) contains interesting information about the foundation, operation, and scope of a Chilean housing cooperative. Some of the information in this booklet helps to illustrate the stages of growth of a housing cooperative society from the time the idea was first mooted until the time when building was completed and the families moved into a new estate equipped with all the necessary facilities.

The society in question was formed in Maipú, an industrial suburb of Santiago, by a group of young working-class couples. It was the result of an idea first put forward at the end of a working-class study group which had been discussing a number of problems facing its members. It was agreed that, for young couples, the housing question was vitally important. The suggestion was put forward that one practical way of dealing with it would be to form a cooperative. The various stages in the life of the cooperative were as follows:

(1) First, an investigation was made to find out the needs and desires of the group as regards housing.

(2) Next, a cooperative educational campaign was started to familiarise future members with cooperative principles, practices, and methods, with special reference to housing cooperatives.

(3) An application was made, as required by law, to have the group recognised as a cooperative and to get it legally incorporated. The cooperative was thus legally founded with a capital of 73,000 pesos contributed by the 73 members who constituted the founders.

(4) Negotiations began for the purchase of suitable building sites. Not only the management committee, but also the ordinary members organised week-end excursions to look for the best site for the future estate.

(5) A savings plan was devised and members undertook to save a fixed monthly sum, which was pegged to any increase in wages caused by the inflation then rampant in the country.

(6) The entire membership took part in the selection of a site. The reasons for the choice were as follows: the low cost of the land,

ease of site preparation, transport facilities, and the fact that there was sufficient land for the construction of such amenities as a school, swimming pool, gardens, sports field, church, theatre, consumer cooperative, etc.

(7) Because of the large area of land acquired, a drive was launched for new members, and as a result the total membership increased to 162.

(8) In view of the need for cooperative education in order to imbue each member family with the spirit of the society, a standing education committee was set up. It was given responsibility not only for organising short courses on cooperation, but also for running such activities as a library, a choir, a women's association, holiday schemes, the savings and loans department, and a welfare section. One interesting step taken by the committee was to hold family galas on the sports field so as to promote good-neighbourliness and help members to get to know each other better.

(9) The savings and loans method was used to finance the housing, and a loan of 805,742 escudos [1 escudo = 1,000 pesos] was obtained at an interest rate of 4.5 percent. The building site which had been acquired earlier, and was by then almost completely prepared, was treated for the purposes of the loan as a saving by the members.

(10) It was decided that the net cost of the housing must not exceed 77.10 escudos per square metre and for repayment of the loan, a progressive scale was laid down in accordance with families' incomes.

(11) Technical help was sought from TECNICOOP for the actual construction of the houses. Building materials were selected, bids were invited for the building of 162 houses, and five firms applied. The contract was awarded and building duly began.

(12) The members moved into their new homes. Each house consists of a large sitting-dining room, three bedrooms, a kitchen, bathroom, and usual offices.

(13) Three additional cooperatives were formed to handle other aspects of the housing scheme, viz., a consumer cooperative, a savings and loans cooperative, and a handicrafts cooperative. A school, church, and clubhouse were built; and community health and welfare services set up.

Conclusions

Chilean experience in cooperative housing has shown that, despite their inevitable limitations, the social and economic operations of cooperative housing societies are now on a sufficient scale to deserve serious consideration in framing any national policy for overcoming the housing shortage in Latin America.

Compared with the sheer scale of the problem, the Chilean experiment may admittedly seem like a drop in the ocean. But the cooperative approach should rather be thought of as a seed which, if sown in

fertile soil and suitably nurtured, "grows and spreads, and sows itself anew"; for the cooperative approach provides the best solution to the housing shortage. In short, cooperation has great potentialities and can do much to overcome the housing shortage, but only on condition that each country's housing policy be designed to create an environment in which the movement can flourish.

Some of the methods required to promote this development in Latin America would entail direct action by governments, while others would require indirect action. Although, in principle, these are measures that the cooperatives themselves should take, the fact remains that, if they are to be effective in underdeveloped countries, adequate government backing is necessary.

Some examples of the direct action required are:

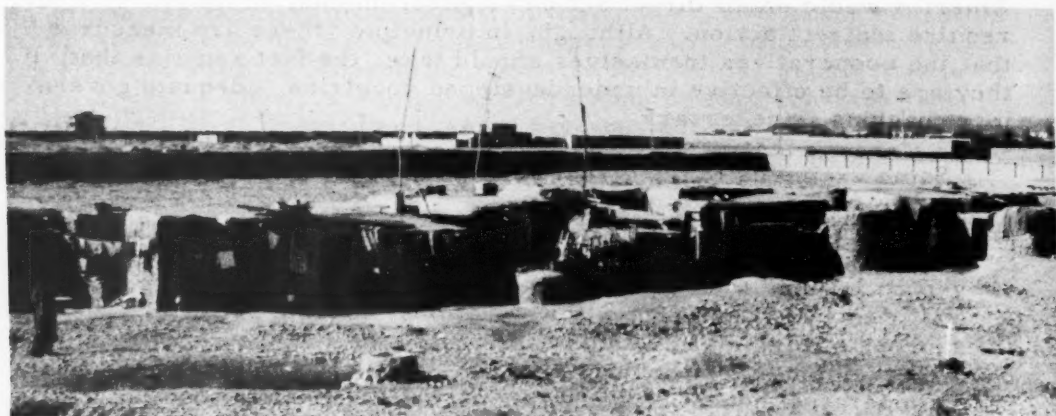
- (a) recognition of the important part that cooperatives can play in the provision of housing — especially for families in the lower-income groups — and, in consequence, the assignment of major responsibilities to the movement within a national housing policy;
- (b) appropriate legislation and establishment of machinery to promote the development of cooperatives and give them technical assistance;
- (c) a cooperative education programme, both theoretical and practical, with special courses on the cooperative housing movement;
- (d) provision of adequate finance to make it possible to pursue a long-term policy of cheap credit.

The indirect action required consists in providing effective help to the cooperative housing movement by taking the legal, technical, or financial measures needed to enable societies to:

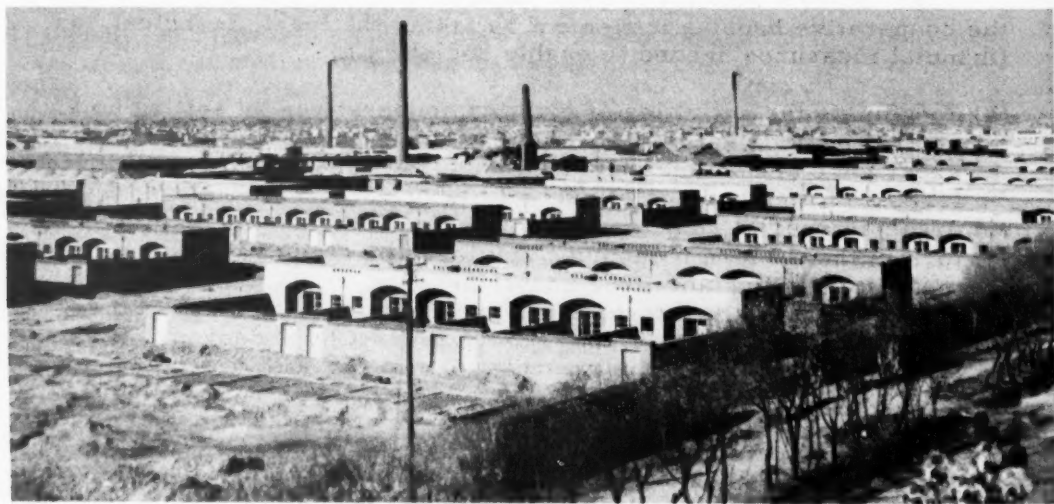
- (a) coordinate the activities of existing cooperatives by setting up a central body or national federation to pool available resources and experience and watch over the social, technical, and economic interests of member societies;
- (b) organise special short courses to train managers and administrators in the modern techniques employed by the cooperative movement in the more advanced countries;
- (c) employ national or international credits to finance programmes;
- (d) eliminate speculation on the housing market by endeavouring to cut building costs through bulk purchase of materials or direct manufacture;
- (e) rely on self-help and mutual aid whenever possible in order to limit the need for outside finance and thereby speed up the solution of the problems caused by the shortage of housing in Latin America.

HOUSING PROGRAMS IN LESS DEVELOPED COUNTRIES

In societies all over the world, people have traditionally built their own houses. The results, however, have not always been satisfactory. Poor housing is bound to affect health, morale, and job efficiency.



In Teheran, Iran, factory workers were moved from inadequate housing they had built themselves (above) to the low-cost, but much more solid housing below.



[Pictures in this study courtesy of the Inter-American Development Bank and of the Office of International Housing of the United States Department of Housing and Urban Development.]

Sometimes improved housing means more imaginative use of local construction materials, as in this Philippine Government demonstration project,

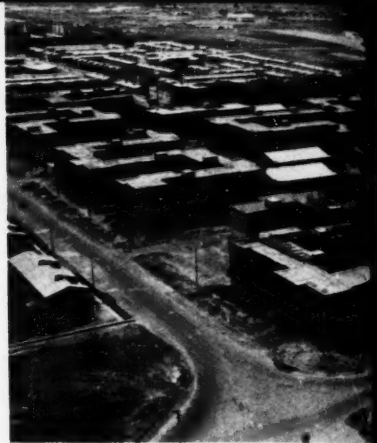


... or appropriate, yet simple, modifications of traditional styles, as in this smokeless chula in Iran.



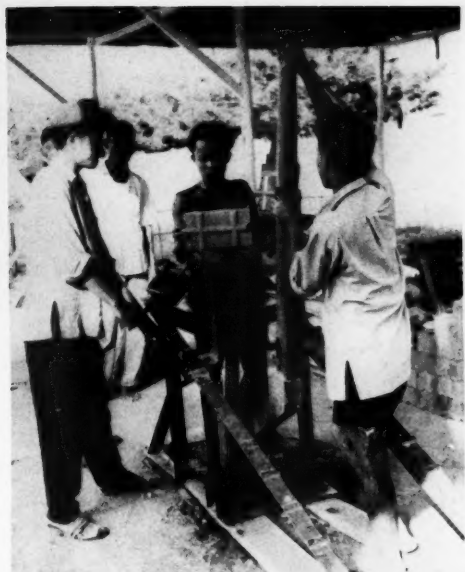
When housing projects are undertaken, not all are elaborate and capital-intensive, like the one near Bogotá, Colombia, at right.

At the self-help project at Conavi, Bolivia, shown below, future residents contribute their own labor to build homes of simpler design.



Cooperative efforts, too, have yielded impressive results. Shown here is the new cooperative community of Maipú, described in the preceding article, near Santiago, Chile.





Equipped with local lumber and mud, a simple brick-making machine, some cement, and plans. Cambodian villagers construct a sturdy and modernized version of a local house.





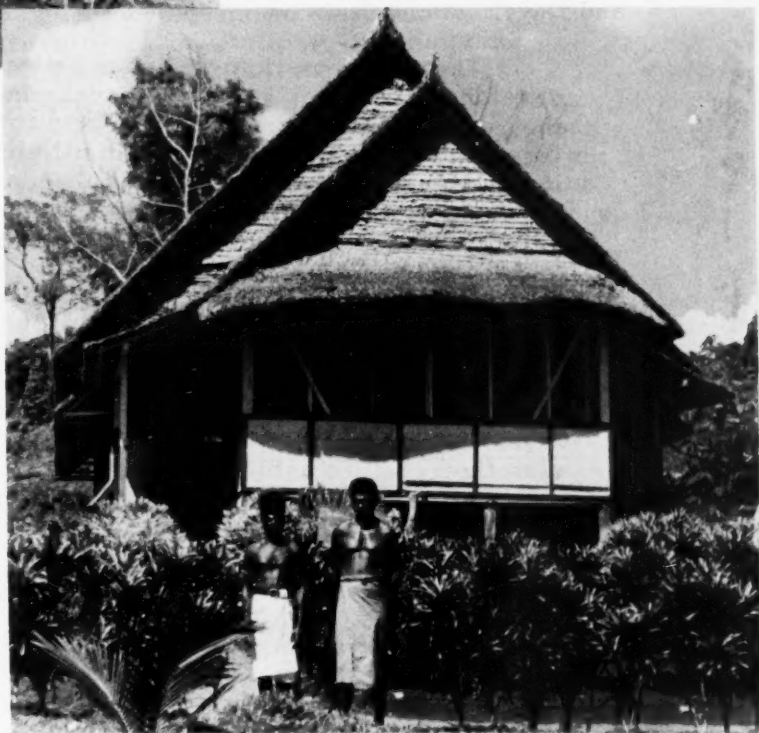
Housing needs are by no means confined to the cities, as shown by these examples from Venezuela (above and below) and Guatemala (at right). In fact, obtaining adequate housing may simply mean adding to existing structures. The Venezuelan pictured below is able to do so, thanks to a loan from the Alliance for Progress Social Progress Trust Fund.



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No matter what programs are initiated, people build according to their own culture. Here are examples from Greece (upper right), Colombia (above), and New Guinea (lower right).



EFFICIENCY CRITERIA IN DEVELOPMENT AND ASSISTANCE

Development literature has recently seen the rapid proliferation of writing on development performance; self-help criteria; and efficiency in allocating foreign aid, for the donor countries, and in using it, for the recipient countries. While most development efforts are financed within the developing countries themselves, aid from high-income countries has had a significant impact on development plans. This new concern with efficient utilization is stimulated by a growing pessimism regarding future increases in the availability of foreign aid. The United Nations General Assembly has urged the high-income countries to devote 1 percent of their GNP to aid to low-income countries, but assistance seems to have reached a plateau in total amount well below that figure. George D. WOODS, President of the International Bank for Reconstruction and Development, succinctly expresses the general concern,

"There is a marked variance between what the developed countries say about development and what they do about it. Assurances of help to the developing countries are always made in all sincerity. But if we look at the figures, we find that in fact aid is now on a plateau. The total flow of long-term capital from the developed countries has remained at about \$9 billion per year since 1961, despite a rise in gross national product of the developed countries over that period. Thus, development aid represents a declining percentage of the aid-givers' national income.

"Between now and 1970 the less developed countries might productively use an additional \$3-4 billion a year. I myself see little point in arguing about precise figures. To achieve that, we need to change political climates — in the industrialized countries, to permit a much greater flow of official capital, and

in the developing countries, to encourage a much greater flow of private investment from abroad.

"If the considerations I have mentioned are taken together and if they are viewed against the background of a certain boredom, at the least, and disillusionment, at the worst, with the subject of development finance in most of the [industrialized] countries, you can see why I am so concerned about the prospects for economic development.

"In my daily activities, I am constantly and sympathetically aware of the impatience, disappointments and frustrations in the developing countries; but at the same time I am conscious of the frustration and disillusionment that the industrial nations feel about development finance. Governments which provide development finance are subjected to searching questions by their legislatures and peoples about it. The most careful use of aid by each of the recipient countries is constantly necessary if they are to expect continued assistance, and on a larger scale. Performance will have to stand up to close scrutiny."

[Excerpts from addresses to the Ministerial Meeting of the Development Assistance Committee of the OECD, Paris, 22 July 1965, and to the Board of Governors of the World Bank institutions, Washington, 27 September 1965, reprinted in Current, Number 65, November 1965, pp. 56-60.]

Such concerns naturally lead to an emphasis on performance. Much of the research and analysis which accompanies this new emphasis has not been made public, since aid donors are often as sensitive to criticism of their criteria for giving aid as aid recipients are to criticism of their use of aid. On the American continent, the member countries of the Alliance for Progress jointly evaluate progress in reform and in the use of aid as criteria for further assistance. These discussions are not a matter of public record, but others are.

At the beginning of their study, Promoting Effective Development Policies: AID Experience in the Developing Countries (AID Discussion Paper No. 9, Washington, AID, Office of Program Coordination, 1965), Clarence S. GULICK and Joan M. NELSON set out the assumptions of the quest for performance criteria.

"Both experience and analysis confirm that success by less developed countries in achieving economic progress is heavily dependent upon their

pursuit of appropriate policies and programs. Foreign assistance is very important, but its cost will be greater and its results less if the recipient country does not do its best. Since aid is limited, it should be concentrated where it will be most effective.

"Less developed countries vary widely in their ability to mobilize and make good use of resources for development. Many are already making strenuous efforts to help themselves; five-sixths of investment taking place in the developing countries is self-financed. In every case, however, there are important measures which could improve the results achieved.

"Self-help measures range from steps to improve the effectiveness of specific activities to much broader efforts to undertake basic reforms in, for example, tax structure; to alter investment priorities as between sectors; to modify an entire import control system or to give substantially greater encouragement and freedom to private initiative. However, the success of any development effort depends not only on appropriate general policies, but also on innumerable, more limited improvements in organization, management, and policies in important sectors and sub-sectors. These improvements can be encouraged and supported by different aid techniques, including many kinds of technical assistance as well as explicit understandings in connection with loans for capital projects."

The first selection in this section is from Chairman Willard THORP's annual report on policies of the members of the Development Assistance Committee of the Organisation for Economic Cooperation and Development. It stresses the possible gains from cooperation between assistance donors and recipients in evaluating performance. The subsequent selections are provisional attempts to establish criteria for evaluating performance. W. Arthur LEWIS, Douglas PAAUW and John FEI are all interested in how a country increases the proportion of its national income that it saves and invests, so that it will be able to finance its own growth. Paul G. CLARK suggests a set of indicators of a country's effective commitment to economic progress which include more social factors.

PERFORMANCE: A CENTRAL FACTOR IN DEVELOPMENT

Willard L. Thorp

[From Development Assistance Efforts and Policies of the Members of the Development Assistance Committee; 1965 Review, Report of the Chairman, Paris, Organisation for Economic Cooperation and Development, 1965, US\$ 0.75, 146 pp.]

[The Development Assistance Committee of the OECD serves as a clearing house where members consider common problems of volume, form, terms, organization, and effectiveness of their economic assistance. The 15 members of the DAC account for approximately 90 percent of the financial resources being made available to less developed countries through their bilateral programs and through their contributions to multilateral agencies.]

These are excerpts from a chapter of the report.

The less developed countries themselves provide the resources for 80 percent of their capital formation. When assistance goes to countries where local conditions and efforts favour development, it can reinforce and accelerate the process and ease some of the bottlenecks which obstruct progress. But achievement of a substantial and cumulative process of development depends essentially on efforts and conditions in the less developed country itself. If local conditions are unfavourable and local efforts are insufficient or misapplied, assistance can make only limited contributions to economic and social advance, if any.

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For these reasons, assistance providers have naturally been interested in standards of performance in the less developed countries, and have been concerned that these standards should progressively improve. This interest is one which, in major essentials, they share with the less developed countries themselves. For less developed countries, interest in good performance is interest in their own development. The existence of a very real, common concern with good performance finds its expression in the emphasis on performance factors in the UN Conference on Trade and Development recommendation, Guidelines for International Financial Cooperation, which was accepted without dissent. On their side, the Development Assistance Committee (DAC) countries wish their assistance to be provided in forms and quantities which will encourage and support improved performance. They hope that, so far as feasible, the recipient country will also seek conditions which will contribute constructively to solidly based and sustainable development.

These considerations have led both national and international suppliers of assistance, in the first place, to activities which contribute to improvements of performance. Through technical assistance, the members of the DAC help less developed countries to improve their planning, the selection, design and execution of development activities, and a range of other aspects of performance. Project assistance has rather generally been made subject to particular stipulations concerning the design, execution, and proper operation of the projects financed. More recently, it has become increasingly evident that economic development requires good performance in many areas of more general policy which otherwise can interfere with the achievement of economic and social development objectives. As the most advanced application of this concept, the United States is experimenting with agreements with a few less developed countries whereby disbursements of programme assistance are related to and made conditional upon specific performance in broad aspects of developmental and general economic policy such as fiscal or balance-of-payments management.

The objective of achieving the maximum effective use of both foreign and domestic resources has significance for the actions of suppliers of assistance as well as of recipients. For example, there is the problem of long-term commitments which sometimes arises because the process of annual appropriations makes it difficult for the country providing the assistance to assure the full financing of a project requiring a number of years to complete and yet which ought not to be started if it cannot be completed. There are problems of timing, administrative delays, and lack of flexibility to meet the conditions of the particular recipient. The solution of these difficulties also is part of improving the effective use of resources.

The types of domestic action which will contribute most to economic development will not be the same for all less developed countries, nor the same for any one country at different points in time. The same can be said for assistance requirements. They will vary greatly with the stage of development and the administrative evolution of the recipient. Thus, while a broad framework of principle and policy would be helpful, each less developed country is a special case.

International Coordination and Plan Size

It seems clear that there needs to be a closer working relationship between suppliers of assistance and recipient countries. For example, too often a development plan starts with a given set of objectives to be satisfied and ends up with a specific requirement for external assistance. However, in making assistance decisions, it is useful to be able to consider the probable effects on development of alternative amounts and kinds of assistance as well as of different domestic policy choices.

In this connection, it has been pointed out that, in some cases, the planners in the less developed countries themselves work out a range of alternatives in the early stages of their work. On occasions, these alternatives may have been explored in more detail than assistance providers could hope to reproduce. This leads to the idea, which has already been tentatively advanced elsewhere, that discussions between providers of assistance and less developed countries might better begin at a fairly early stage of the planning process when a range of alternative amounts and kinds of assistance and their implications for plan targets might still be taken into account.

Mutual Interest in Performance

One can build up a plan which is related to some rate of growth or employment objective and find that it requires an amount of foreign assistance which is outside the immediate absorptive capacity or the prospect of availability. However, in the development of some plans, it appears that an estimate is made of the amount of assistance which that country can expect to receive from the remainder of the world and the planners are then obliged to take this amount of assistance as a fixed datum. Some intermediate procedure would appear to be preferable. Perhaps the country's experts and the potential suppliers of assistance should explore together the potential effects on the development of the country of alternative amounts of assistance and possible related variations in some aspects of domestic policy. On the basis of this consideration, they might feel justified in planning for an amount of external assistance different from that estimated by the finance minister which had been used as the basis of the actual plan, or that which would be the result of some single assumption with respect to a growth target.

Development assistance involves a new and unprecedented form of relationship between sovereign nations, in which each has an interest in the performance of the other. Countries which provide assistance are conscious that they are performing a voluntary act, one which imposes real costs upon themselves, and which entitles them to some participation in decision making. Even without this background, it would be natural that they should be interested in conditions increasing the effectiveness of the assistance and of the development processes to which it contributes. It is equally natural that less developed countries, many of them only recently independent, should be sensitive about infringements of their sovereignty, and should prefer that development assistance should be provided "without strings attached." While assistance policy needs to take these sensitivities into account, an assistance agreement may be regarded as a form of joint venture by supplier and recipient. There is nothing new or unusual in sovereign countries' entering into undertakings for their mutual benefit. And such agreements can serve as a basis for facilitating longer-term assistance undertakings.

Many agreements on performance can be reached with little or no difficulty. On occasion, agreements with suppliers of assistance can help recipient governments to take necessary, but politically difficult, measures. On other occasions, it is necessary to exercise judgement as to how far it is proper to withhold assistance because internal policies do not appear to favour efficiency in development and in the use of assistance. As a general conclusion, the common concern with improving performance shared by assistance-providers and the less developed countries should be expressed through a continuing dialogue on principles of mutual respect and common interest.

There are clear advantages in a coordinated approach by DAC members to the task of promoting improvements of development performance. The efforts of any one country or institution are apt to be weakened if other suppliers of assistance emphasise different aspects of performance or provide assistance without showing any concern with performance considerations. Less developed countries should not be asked to do too many different things at once, still less to undertake incompatible commitments. For them, a common dialogue should be much more satisfactory.

Scope for Multilateral Approaches

Moreover, efforts by the assistance-providers to promote improvements of performance are likely to be more acceptable to less developed countries if they are clearly seen to be part of a general policy applied impartially to all countries receiving assistance, motivated by a desire to accelerate development rather than by any national advantage to be obtained. Discrimination arises if great emphasis is placed on

improvements of performance when dealing with some countries, but not when dealing with others.

The regional institutions are also important in suggesting improved policies and programmes. These multilateral institutions have advantages in engaging the trust and respect of less developed countries which are members of the same institutions and represented on their governing boards.

Where consortia and consultative groups have been established, the framework already exists for establishing a closer relationship between performance and assistance. Recently, the international agencies involved in these groupings have placed much more emphasis on analysing with the less developed country the short-run and long-run situations in terms of both domestic and foreign requirements. However, it seems possible that these consortia can be used, to a much greater degree, as places for discussion concerning ways and means of increasing the effective use of available foreign and domestic resources. The International Bank for Reconstruction and Development has announced a decision to organise "a significant number of consultative groups" in the hope that "the resulting give-and-take of ideas, finance, and technical assistance may well produce an important breakthrough, enhancing the performance of receiving countries and inspiring new confidence in those who supply assistance."

In the case of Latin America, the Inter-American Committee for the Alliance for Progress is providing an evaluation of performance and requirements for the Latin American countries. While it is too early to pass judgement upon its effectiveness, it furnishes a meeting-ground for the individual country, its peers, and a selected group of experts for the purpose of evaluating and advising on the country's performance, achievement, and requirements for external assistance.

ALLOCATING FOREIGN AID TO
PROMOTE SELF-SUSTAINED
ECONOMIC GROWTH

W. Arthur Lewis

[From Motivations and Methods in Development and Foreign Aid, Proceedings of the Sixth World Conference of the Society for International Development, March 16-18, 1964, Washington, D. C., Theodore Geiger and Leo Solomon (eds.), Washington, Society for International Development, 1964, US\$ 3.00, pp. 20-23.]

These are
excerpts
from the
paper.

Most of us have wondered from time to time about the proper basis for deciding how to distribute aid between the many countries of the underdeveloped world. Commercial aid is fairly straightforward. One charges $5\frac{1}{2}$ or 6 percent interest, and any project which can clearly earn this rate automatically qualifies. However, commercial aid is only part of the picture. There has always been a plea for aid for social projects which do not meet the commercial test, and this plea has been reinforced recently by the calculations which claim to show that investment in human resources, which earns no commercial return, actually adds as much to national income as equivalent investment in physical resources. Whatever the merits of the argument, non-commercial aid, whether low interest loans, soft-currency loans, food for peace, or plain grants in aid, now has a well established place in the repertory of foreign aid.

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The majority of underdeveloped countries have opposed distribution on political lines, and have clamored for more aid to be channeled through the United Nations. In any case, aid from other sources will continue, and it is useful to ask whether one can devise a sensible basis for distributing aid on non-political terms. My interest in the subject springs principally from wondering how the United Nations would distribute a relatively large sum, say US\$ 500 million a year, if such were made available.

When one moves from the political basis, there is still a wide range of choice between non-political bases. For example, one could choose need, giving most weight to countries with the lowest output per head. One could choose success, giving most weight to the countries with the highest annual rate of growth of gross domestic product. One could choose simply to subsidize some desired object — for example to pay one-half of every country's public education budget, or one could choose among the various indices of self-help — for example, giving aid only to new projects for which the receiving government itself puts up three-quarters of the funds.

I do not want to argue the merits of the various possible non-political bases, or to choose between them. Instead, I have arbitrarily selected a formula of my own, which I wish to throw out for your consideration. I do this, not because I think it necessarily superior as a practical proposition, but because it highlights what I think should be the major purpose of foreign aid.

People support foreign aid for all sorts of reasons, but I suppose that most of us are interested mainly in achieving self-sustaining growth. The emphasis is on the qualification, "self-sustaining." We are interested mainly in seeing countries through a transitional period to a situation where they can maintain adequate growth without needing further outside help.

This situation can be defined in quantitative terms. Economic growth depends on a great many institutional and psychological factors, but in terms of finance, which is the chief province of foreign aid, it depends on adequate expenditures on public services and on capital formation — on public services to supply roads, education, public health, and an administrative and legal framework; and on capital formation to provide physical resources. Excluding defense, public expenditure and gross capital formation together should absorb at least 30 percent of gross domestic product, leaving 70 percent for personal consumption. In less developed economies, public expenditure and capital formation absorb more nearly 20 percent, and consumption takes 80 percent. The financial condition of self-sustaining growth can therefore be put starkly, if not precisely, by saying that the share of consumption must fall from 80 percent to 70 percent of gross domestic product.

This cannot be done overnight. In the first place, an absolute fall in consumption is out of the question. The change has to be achieved by having output rise faster than consumption. One can say further that an increase in consumption per head is imperative. Economic growth itself demands it, since growth will not occur without incentives, and incentives mean increased consumption per head. Besides, a period of rapid social change is a period of great social tension, which easily turns into strike, riot, and revolution unless some of the extra product is used to satisfy the immediate aspirations generated by change. When you allow for the increased consumption taken up by population growth, and the per capita increase as well, I judge that the ratio of consumption should not fall by more than 0.5 percent per year, so that a fall from 80 to 70 percent should take 20 years.

The essence of my proposal is that the amount of foreign aid should be tied to success in achieving this objective. A country should get much aid if the proportion spent on government services and capital formation is rising quickly, and should get no aid if this proportion is constant. This test differs from the project test in that, however good the projects may be, no aid is forthcoming if the resulting increase in national product is merely swallowed up by a proportionate increase in consumption. Though it is a self-help test, it is more stringent than other self-help tests in that it rules out self-help schemes which increase national income merely to increase consumption proportionately. The test rules out any country which is not clearly proceeding toward making foreign aid unnecessary by mobilizing an increasing proportion of its own resources for investment in human and physical capacities.

The proposal can be translated into the precise terms of a formula. Let S be the magnitude we are testing, the sum of government use of resources on current account, plus gross capital formation from domestic sources. Government is defined here as in national income accounting to exclude transfers, which also means that a country cannot get more aid simply by spending more on social welfare services. Also, for this formula, deduct military expenditure from government expenditure. From gross capital formation deduct what is financed by foreign capital, since we are interested in how the country uses its own resources. However, for this purpose, reinvestment of profits by foreign companies should count as domestic saving, since it is part of the savings generated by the economy itself.

I would make aid equal to the amount of growth in the ratio of S to gross domestic product in the past three years. So,

$$\text{aid equals} \quad \frac{S_1}{\text{GDP}_1} - \frac{S_4}{\text{GDP}_4}$$

Thus, if expenditures on government, non-military services plus capital formation from domestic sources constituted 24 percent of gross domestic product in a given year and had been 22 percent three years earlier, then foreign aid would equal 2 percent of gross domestic product. An international team of national income statisticians would make the calculation every year, on agreed definitions.

This formula helps the poorer and the better-off underdeveloped countries equally. All that the country has to show is that it is making progress in deflecting resources from consumption toward investment. It is then rewarded by receiving a grant, or a soft loan, equal to the progress it has made. This aid polices itself; one does not need an army of foreign aid officials to examine hundreds of projects and select those which are to be aided. For if the country does not use its resources properly, the ratio of consumption will automatically cease to fall, and aid is automatically reduced and eliminates itself within three years. This is just about the simplest self-policing aid formula that one could devise.

I don't suppose it stands any chance of acceptance in such a simple form, but that it corresponds to something for which people are searching is clear from the enthusiasm with which the Alliance for Progress was greeted. The Alliance is based on the same general idea, namely that countries should be helped only if they demonstrate that they are making an effort to solve their problems. The Alliance does not pick on one simple index, like my S. It appoints wise men to consider the whole complex of problems and proposals in each country. This is both a gain and a loss; a gain because more is taken into account, but also a loss because taking more into account lands you into a maze of hypothetical schemes, broken promises, and excuses for poor performance which cause disillusionment and bring discredit upon a noble idea. My formula simply rewards achievement, and takes civil servants out of the business of planning social revolutions in other people's countries.

FOREIGN ASSISTANCE AND SELF-HELP:
A REAPPRAISAL OF DEVELOPMENT FINANCE

John C. H. Fei
Douglas S. Paauw

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Planning Association, Center for Development
Planning, made possible by a research contract
with the Agency for International Development.]

This is a
summary
of most of
the paper.

It is generally believed that foreign capital in-
flows play a strategic role in promoting progress
toward self-sustained growth in developing countries.
Yet the relationship between the two has received
little rigorous analysis in the voluminous literature
on economic development. The Foreign Assistance
Act of 1961 enunciated the criterion of "self-help" as
a condition for United States foreign aid, but the ap-
pealing self-help slogan has not been given analytical
content.

Professor Rosenstein-Rodan recently raised
some of the important analytical questions associated
with the self-help notion. (Review of Economics and
Statistics, May 1961)

"The purpose of an international program of
aid to underdeveloped countries is to accelerate
their economic development up to a point where

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a satisfactory rate of growth can be achieved on a self-sustaining basis. . . . Thus the general aim of aid. . . is to provide in each underdeveloped country a positive incentive for maximum national effort to increase its rate of growth. The increase in income, savings and investment which aid indirectly makes possible will shorten the time it takes to achieve self-sustaining growth. Economic progress is measured primarily by increases in income per head. . . ."

It is the purpose of this paper to further analyze these and related issues by studying the relationship between external assistance and the mobilization of domestic savings, which we take to be the essence of the self-help problem. We construct an aggregate, dynamic model to analyze the problem, and we apply the model to project foreign capital requirements for a sample group of 31 countries.

Several key notions implicit in the "self-help problem" receive emphasis in the analysis which follows:

- a) the interaction between foreign aid and domestic austerity efforts;
- b) assurance that a reasonable termination date be built into the assistance program;
- c) the prospect that foreign aid will achieve its primary economic objectives of providing an adequate rate of growth of per capita income and consumption; and
- d) confidence that the accumulated volume and annual flow of foreign aid to satisfy these conditions will be within reason.

By stressing these elements, our analysis yields both quantitative and qualitative results. On the one hand, it provides numerical answers to such important assistance questions as the duration of aid, the time path of its flow, the peak year volume, the accumulated value over time, and the required domestic savings to achieve the prime objective of foreign assistance. On the other hand, by identifying and classifying specific types of assistance relationships, the model yields qualitative insights relevant to both formulation of assistance strategy and domestic development planning.

The Aggregate Growth Model

The model developed in this paper is in the Harrod-Domar tradition. In brief, the Harrod-Domar model is based on: 1) the capital-output ratio, a constant relationship between capital invested and resulting output; 2) the identity of savings and investment in a closed economy; 3) the dependence of the growth of capital stock on the amount of savings; and 4) the average propensity to save, the relationship between savings and total output (GNP). Thus, in a closed economy,

savings determines changes in the capital stock which, in turn, determines rate of growth of GNP. However, savings, itself, depends on GNP since, for any total output, the average propensity to save gives the proportion of GNP that will be saved.

In an open economy, additions to capital stock can be financed not only by domestic savings, but also by foreign savings, i. e., foreign investment and assistance.

Instead of assuming that savings are determined by total GNP, we postulate that the percentage of GNP which is saved relates to GNP per capita. This concept, which we call the percapita marginal savings ratio (PMSR), reflects the fact that, especially at low levels of income, what a nation saves may substantially depend on income per capita. It takes account of the frequently neglected factor of population growth and avoids some of the rigidities of the Harrod-Domar model, which tend to make it irrelevant to analysis of the role of foreign aid in development. Furthermore, the PMSR serves as an indicator of the domestic austerity effort furnished by the less developed country.

If GNP per capita is growing and the PMSR is positive, an ever higher proportion of the national output will be saved, and economic growth will accelerate. If GNP is growing but the PMSR is low relative to the rate of population growth, then, in the absence of foreign aid or investment, the capital stock will decrease and growth will stop. Only ever increasing imports of foreign capital could maintain growth. However, if GNP per capita is not growing, but the PMSR is relatively high and population growth is not too rapid, then foreign investment and aid might be able to augment capital stock and to raise GNP per capita to the point where it would call forth enough domestic savings to sustain adequate economic growth. In such cases, domestic savings alone would be unable to initiate economic growth.

Desired Rate of Growth and Foreign Savings

To investigate the relationship between economic growth and foreign savings, we use a target rate of growth of GNP per capita — the growth rate which the country has adopted in its plan.

Once we know the target growth rate of GNP per capita, the rate of population growth for a country and the capital-output ratio, then we can determine the investment required to achieve that growth rate. If we also know the present amount of domestic savings and the percapita marginal savings ratio, it is possible to determine the amount of foreign savings that a country will need in any year to achieve this growth rate.

Application of the Model

A model was developed on the basis of the considerations mentioned above. Figures for the five crucial variables: initial savings ratio, percapita marginal savings ratio (PMSR), capital-output ratio, target growth rate of GNP per capita and population growth rate, were worked out for a group of 31 aid-receiving countries. These data were fitted to the model, and the amount of foreign saving required for each country in each year in order to achieve the target growth rate was worked out by a computer. In cases of successful achievement of self-sustaining growth at the target rate, the need for foreign savings, i. e., aid or investment, disappeared, and the country was in a position to export capital. The number of years to this achievement of self-sustaining growth was called the termination date. [See Table I]

One of the 31 countries, Yugoslavia, already generated sufficient domestic savings to sustain its high target growth rate. Furthermore, its high PMSR indicated that about half of all gains in GNP per capita would be saved and invested, provided that the same domestic austerity efforts were maintained.

In eight of the 31 countries, the model indicated that, if foreign saving needed to achieve the target growth rate could be obtained, domestic saving would increase to the point where further aid and foreign investment would no longer be necessary. There were termination dates.

In the remaining 23 countries, it was found that, even should the required amounts of aid and foreign investment be obtained, domestic savings would never be equal to the task of financing growth at the target rate. The amounts of aid required kept increasing, and there were no termination dates.

Interpretation of the Results

Only one country was saving and investing enough of its resources to permit it to maintain its target growth rate unaided.

Other countries, which required foreign saving but which showed a termination date, would not have been able to attain their target growth rates in a closed economy, i. e., without assistance. However, the PMSR, the measure of their domestic austerity effort, was high. Therefore, if growth could be sustained temporarily with foreign assistance, they would be able to save an increasing share of their GNPs and, ultimately, to sustain their own growth. The amount of foreign assistance required and the length of time that it would be required are determined by the initial savings ratio, the amount of growth needed merely to keep up with expansion of the population, and the extent to

which gains from economic growth could be devoted to saving and investment.

These countries fall into two classes: the "glide path" class, which is closer to self-sustained growth and in which the amount of foreign assistance required declines monotonically to zero at the termination date, and the "hump scale" class, in which foreign assistance will have to increase in order to maintain the target growth rate before starting its glide down the path to self-sufficiency.

In the remaining countries, our parameters indicated that foreign assistance would have to continue indefinitely and in ever increasing amounts to insure growth at the target rate. With high rates of population growth and/or very ambitious target growth rates, these countries are unable to achieve self-sustaining growth, even with the indicated amounts of aid and investment. Even where initial levels of income per capita and the savings rate are low, a high PMSR plus external assistance can enable a country to achieve self-sustaining growth. However, in cases where domestic austerity is not sufficient, aid will only serve to enable a country to live beyond its means indefinitely, making no progress toward self-sustained growth. Such progress cannot be made unless modifications occur in one or more of the five parameters. Of these, a country's initial savings rate is obviously given and the capital-output ratio cannot be improved (reduced), unless the country is capable of widespread increases in productive efficiency. Three of the parameters: the target growth rate, the rate of population growth, and domestic austerity (percapita marginal savings), are subject, in some degree, to policy control.

Diagram I indicates the determining effect of the population growth rate and of the target rate of GNP growth per capita on a country's chances for achieving self-sufficiency. Diagram II graphically illustrates that, for the 31 countries programmed, the percapita marginal savings ratio, the measure of self-help, determines whether or not the countries are making progress toward the achievement of self-sustained growth and the ability to dispense with foreign assistance. The lowest PMSR among countries that were successful in this regard was higher than the highest PMSR among the unsuccessful.

Effects on the Aid Relationship

Understanding between aid-giving and aid-receiving countries is essential to a harmonious aid relationship. Therefore, it is essential for both partners to understand the amounts of aid that will be required, year by year, and about when the termination date will be. Such an understanding could allow aid-givers to assure their partners of requisite support and could make long-term planning possible for aid-receivers.

In cases where a termination date exists, foreign aid and investment can be designed to fill the gap between domestic savings and investment requirements. In the gap-filling case, self-help is built into the process. Foreign aid complements the country's own efforts by providing the push needed eventually to achieve self-sufficiency in finance. Close administrative supervision of the assistance program is not needed to insure an adequate self-help response, since the country is already enforcing sufficient austerity and employing its resources with sufficient efficiency to arrive at self-sustained growth, provided that the inflow of foreign savings is adequate to fill the gap consistently.

Where there is no termination date, foreign assistance should be designed to narrow the gap, since self-help will otherwise not be built into the relationship between external assistance and domestic savings. Capital assistance alone will merely permit a country to live beyond its means. Hence, if assistance is to be given, there must be agreement on the measures to be adopted to promote greater self-help, and technical assistance may be required to carry out these measures. If successful, the austerity program will narrow the gap as foreign assistance produces leverage effects on the growth of domestic savings capacity. Here the art of providing useful assistance requires sophistication and diplomacy, and costs and administrative demands are likely to be high.

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Table I

Projections for Countries with Prospects for Self-Sustained Growth

Country	PMSR	Initial Savings Ratio	Capital Output Ratio	Target Growth Rate	Population Growth Rate	Initial Population (thousands)	GNP (millions US\$)	Per Capita GNP	Foreign Assistance Termination Date (years)
China (Taiwan)	.27	.13	3.0	4.8	3.2	10,971	1,598	137	32
Colombia	.36	.19	4.5	2.7	2.9	14,443	3,322	230	16
Greece	.24	.13	3.5	4.5	0.9	8,402	3,336	397	17
Mexico	.41	.17	3.2	2.9	3.1	36,091	10,936	303	4
Pakistan	.36	.06	3.0	2.0	2.6	101,300	7,091	70	15
Philippines	.36	.15	3.0	2.8	3.3	29,698	4,366	147	6
Thailand	.35	.15	3.5	3.0	3.1	27,181	2,337	86	12
Tunisia	.50	.08	4.0	3.9	2.0	4,224	634	150	11
Yugoslavia	.49	.35	3.0	10.2	1.2	18,607	3,889	209	0

Diagram I

Population Growth, Target Growth Rates, and Self-Sustained Growth

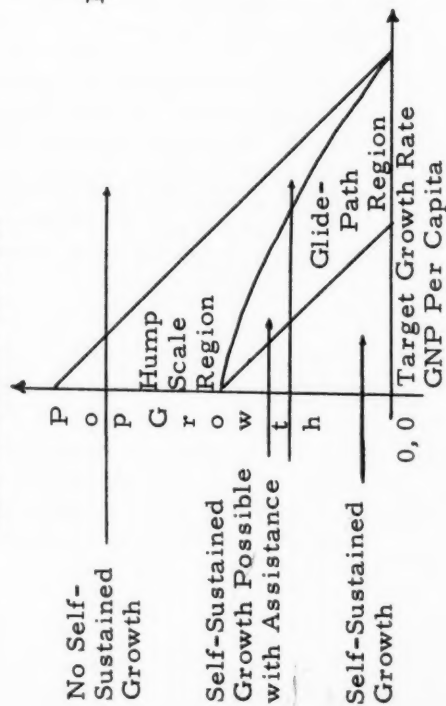
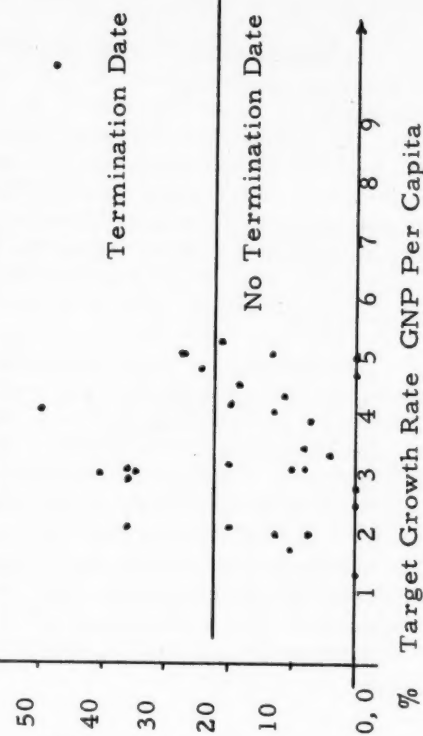


Diagram II

Per capita Marginal Savings Ratio, Target Growth Rate, and Termination of Foreign Assistance (Scatter Diagram for 30 Countries)



INDICATORS OF SELF-HELP

Paul G. Clark

[This was the first in a series of Policy Discussion Papers prepared by and for the Program Review and Coordination Staff of the US Agency for International Development, 1962.]

These are excerpts from the paper.

The question to be considered here is whether a set of statistical indicators can be devised to help in the application of the aid criterion of effective commitment to economic progress, or self-help.

It is presumed from the beginning that any such scheme should have the following characteristics:

- a) It should focus on comparisons among countries.
- b) It should be a simple and readily implemented scheme. The statistical indicators should be among those most widely available and most reliable in countries with limited statistical data systems.
- c) It should leave scope for qualitative judgments. Some relevant considerations are not readily measurable on a comparative basis, e.g., land reform programs, and there are likely to be cases in which a political change makes future improvements likely

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before they are reflected in statistical measures. At the same time, statistical indicators can provide a foundation which qualitative judgments take as a point of departure, and a test of expected future improvements.

The discussion here is divided into three parts, considering respectively, indicators of the level of economic development (as one of several possible grouping devices for inter-country comparisons), indicators of self-help (the main objective of the analysis), and the possibility of systematic consideration of qualitative judgments about countries' development efforts.

Indicators of the Level of Economic Development

Analysts of the development process often find it convenient to think of countries as passing through successive stages of development. Empirical investigation of statistical indicators of the process, on the other hand, reveals that countries are actually ranged in a continuum with respect to any particular indicator. The approach here, therefore, is formulated in terms of continuous rankings of countries with respect to the indicators examined.

But which indicators? One's first inclination is to think of national income per capita as the sole, or at least the decisive, indicator. But on second thought, one reflects that he would not necessarily consider Venezuela more highly developed than Argentina, solely on the basis of a higher per capita income due largely to a profitable petroleum exporting industry, without considering such characteristics as the proportion of the labor force in agriculture and the level of literacy in the population. Even in principle, one's conception of a more developed economy has several different dimensions. Moreover, in practice, statistical measures of national income per capita have a number of well known defects for making international comparisons. There are difficulties simply in measuring national income in economies where many values must be imputed and where statistical observations are shaky, and there are difficulties even more serious in comparing two countries' national incomes when their relative prices are different and when exchange rates reflect quite inaccurately their domestic price structures. Thus, in the approach described here, a set of five separate statistical indicators is suggested for measuring the level of economic development:

- 1) GNP per capita, which is certainly an important, even though not a unique, measure;
- 2) electric power production per capita, which presumably reflects urbanization and industrialization as well as income;

3) the percentage of the labor force in agriculture, which has been widely observed to fall in the course of the development process;

4) motor vehicles per thousand population, which presumably reflects the extension of the road transportation system as well as income;

5) the percentage of literacy in the population, which is both a beneficiary of and a contributor to economic development.

Each indicator is converted into a ranking and the sum is taken as the joint measure of the level of economic development.

One might, of course, wish to consider other indicators. The five presented here have the advantage that they are readily available for a large number of countries, partly because they are (except for GNP) among the most reliably observable measures for countries with limited statistical systems. They also reflect five rather different facets of a country's level of economic development.

How might ranking of countries by level of economic development be used in making inter-country comparisons of self-help in economic development? It should be clear that the former is only relevant as a classification device. One possibility would be to group the countries into discrete classes. It would probably be most useful, though, to keep all countries in a single ranking, and then in evaluating a particular country's indicators of self-help, to compare it with the other countries which are near it in level of economic development.

This ranking by level of economic development may be more directly suggestive in thinking about the appropriate composition of aid programs in different countries. One would presume that, for countries near the bottom of the list, an appropriate aid program would provide much technical assistance and a smaller proportion of capital assistance, while, for countries near the top of the list, the opposite emphasis would hold. While a country's aid program should, of course, reflect its particular needs, an examination of the composition of different aid programs in the light of such a ranking might be very interesting.

Other plausible bases for classification of countries for inter-country comparison might be population size and natural resource endowment. A relevant indicator of natural resource endowment might be exports of primary products as a percentage of GNP. However, I have not been able to think of any very satisfying way of systematically considering these factors in making inter-country comparisons of self-help. Perhaps the only thing to do is to keep them in mind in the course of making inter-country comparisons.

Indicators of Self-Help

The central question remains whether, among countries at similar levels of economic development, meaningful comparisons of their commitments to economic progress, or self-help, can be usefully guided by a set of statistical indicators.

One immediately recognizes that his conception of an effective commitment to economic progress has multiple dimensions. To begin with, a high degree of self-help ought to be reflected in certain measures of the allocation of resources to developmental activity. (For example, in a simple Harrod-Domar growth model, it ought to be reflected in a high percentage of national income invested.) This would normally include such various actions as maintaining a high rate of capital formation, providing adequate tax revenues to finance government expenditure programs, expanding foreign exchange earnings, and investing in higher skills for new entrants to the labor force.

At the same time, a high degree of self-help, if maintained over several years, ought to be reflected in a relatively rapid rate of growth of the economy. (In a Harrod-Domar model, it ought to be reflected in a low marginal capital-output ratio, and hence — for any given investment percentage — in a high rate of growth of national income.) Though different countries' emphases would vary, such growth should normally be observable, not only in an aggregate measure like GNP, but also in both of the important sectors of agriculture and industry. It is true that, in considering such growth measures along with allocation measures in the concept of self-help, one permits differences in natural endowments to affect the inter-country comparisons; but one also takes account of differences in the great complex of institutional factors which affect different countries' economic efficiency.

Finally, an effective commitment to economic progress would surely be reflected in a country's political and social characteristics and programs. Because of their qualitative character, these are discussed in the next section; in this section the concern is with economic indicators of the two general kinds indicated above — measures of the rate of growth of the economy and measures of the allocation of resources to developmental activities.

The seven proposed indicators of self-help are the following:

- 1) increase in GNP in constant prices, which is a desirably comprehensive measure of growth, but which is subject to statistical inaccuracies both in measurement and in deflation;
- 2) increase in agricultural production, which represents both progress in rural areas and success in meeting domestic and export demands;

3) increase in electricity production, in response both to rising incomes and to extending urbanization and industrialization;

4) share of gross investment in GNP, which reflects effectiveness in mobilizing capital but is perhaps the least reliable statistical measure of the group;

5) domestic tax revenue as a share of total government expenditure, which represents both the effectiveness of the government's revenue system and its willingness to eschew inflationary methods of finance;

6) increase in the quantum of exports, which represents a country's progress in meeting balance-of-payments problems, independently of changes in the terms of trade over which it has no control;

7) number of post-primary students per thousand population, which reflects a country's investment in expanding the most economically valuable skills among its citizens.

Again each indicator is converted to a ranking, and the sum of the seven ranks is taken as the joint measure of self-help.

A few technical points about these measures may be mentioned. It would be desirable to have the indicators in such a form that they are not markedly affected by fortuitous events of a single year, yet are susceptible of being noticeably improved over a period of a few years after a government consciously sets out to do so. The indicators of increase are therefore stated over a period of three years, and the indicators of shares are stated as an average over three years. Moreover, for series such as agricultural production and quantity of exports, which are particularly liable to year-to-year fluctuation, the beginning and ending points of the three-year period are two-year averages.

I have used statistical indicators readily at hand, though in a few cases more desirable measures of essentially the same phenomenon might be obtainable. For (3), I would prefer to have an index of industrial production embracing manufacturing and mining as well as electricity; for (4), I would prefer to have gross domestic saving as a share in GNP, to eliminate the effect of differences in foreign investment. Finally, a number of additional measures might be considered, subject to the tests described below. I have already examined (8) increase in the cost of living and found it unsuitable by these tests. Other possibilities might be: (9) proportion of arable land owned by the top 5 percent of landowners, and (10) share of income and wealth taxes in total tax revenue.

Two tests of this set of indicators of self-help have been applied, using data for 21 Latin American countries in the late fifties and early sixties. The first is the correlation between the self-help indicators, which are taken to measure progress in development, and the measure of the level of development. It would be desirable that the two rankings not be closely correlated, since the measure should, if possible, be such that a poor country could demonstrate a more serious commitment to developmental progress than a rich country, despite its starting from a lower level.

The coefficient of rank correlation turned out to be not significantly different from zero. Looking at the individual self-help indicators, only the investment series and the education series were clearly correlated with level of development. All things considered, it seems to me that the joint ranking of the indicators of self-help is sufficiently independent of the level of economic development to be meaningful.

The second test which has been applied is the correlation of each of the seven indicators with the composite ranking. It would be desirable for each of the indicators to show a significant correlation with the others, as a reflection of different facets of a country's commitment to economic progress. At the same time, one would not expect the correlation among measures of progress to be as close as the correlation among measures of level.

In a test using the same data as before, all of the coefficients except that for electricity did prove to be significantly different from zero. While the relatively low coefficient for electricity reinforces interest in substituting some other statistical measure of industrialization, I would interpret this test as supporting the proposition that the set of seven indicators reflects, in a meaningful way, the complex of actions which one could describe as a country's commitment to economic progress, or self-help.

Political and Social Evidences of Self-Help

There are, of course, a variety of political and social evidences of a government's commitment to progress which are not readily measured statistically. Among the evidences frequently mentioned are the following:

- 1) democratic processes respecting individual freedoms,
- 2) adoption of a well conceived, long-run development plan,
- 3) high standards of efficiency and honesty in government administration,

- 4) private and public commitments to rational decision making,
- 5) effective programs to improve land tenure systems,
- 6) tax systems which are equitable while raising adequate revenues,
- 7) trade and exchange policies which promote balance-of-payments equilibrium.

Such political and social evidences are intrinsically intangible. Yet they are clearly very important. How can these qualitative evidences be integrated with the statistical indicators discussed above?

It seems to me that the simpler the procedure the better in this area. The most elemental form of ranking, in which the various political-social factors are weighed intuitively, is likely to be most practicable. I would simply ask a group of reputable analysts familiar with many countries in a region to classify countries, in the light of this entire complex of political-social evidences, into perhaps three broad classes with different degrees of commitment to progress. It does not seem desirable to try to combine these political-social judgments formally with the economic indicators.

PLANNING WATER RESOURCES: DESALINATION

In many parts of the less developed world, there are resources that could be exploited for economic development if water could be provided cheaply enough. Extractive and manufacturing industrial complexes could grow around desert ore deposits, and crops could be grown on what is now dry soil. Men have long dreamed of making the desert bloom, and a cheap way of desalting brackish or sea water has been one of their principal hopes. This is especially true in less developed countries, where unexploited natural resources and arid conditions are most frequently juxtaposed, and where 90 of the 100 desalination plants now operating or under construction are located.

A considerable and increasing amount of research has been devoted to problems of providing water economically by desalination or by other means. Two recent, comprehensive meetings — the United Nations Inter-regional Seminar on Economic Application of Water Desalination, in New York, and the First International Symposium on Water Desalination, held in Washington and sponsored by the United States Government — drew experts from all over the world and provided a synthesis of results to date.

If one can summarize these results, they show that water desalination is still much too expensive to compete with other sources of water for most purposes, especially in capital-poor, low-income countries, except in special circumstances. The cost of desalination is falling — facilities in Kuwait commissioned in 1960 produce water at only 22 percent of the unit cost of a plant commissioned in 1953. Moreover, present desalination costs can be reduced by adopting the most efficient available technology and by taking advantage of expected technological refinements. Nevertheless, many experts, including Joseph BARNEA, Director of the UN Seminar, expect no major technological breakthrough that will spectacularly reduce desalination costs in the next 20 years below what could be obtained with known techniques. Within this period, BARNEA suggests US\$ 0.50 per thousand gallons as a realistic estimate of desalination costs for single-purpose plants.

Planners must consider situations where potential exploitation of resources might make desalination economic for domestic and industrial uses, although use of desalted water for irrigation seems to be excluded for the foreseeable future. Therefore, they must compare desalination costs to those of alternative methods of water supply and to alternative uses of capital for other development projects.

Two selections below, from presentations to the New York and Washington meetings by Joseph BARNEA and John BRADBURY, deal with cost.

The literature on water desalination is, for the most part, highly technical, and we do not attempt to provide information on techniques in this section. The final selection, however, reviews recent sources judged to provide specific information of particular interest to planners.

WATER COSTS IN DEVELOPING COUNTRIES

Joseph Barnea

[From a paper presented at the First International Symposium on Water Desalination, 3-9 October 1965, Washington (D. C.). The Proceedings of the Symposium will be published by the United States Government Printing Office in mid-1966.]

These are excerpts from the paper.

The vast bulk of the water consumed in developing countries is for irrigation. Even the gross income obtained from the utilization of a thousand gallons of water, apart from the actual cost of water, is far below any foreseeable cost of desalinated water. A recent survey by a team of United Nations experts found that, in Madras State (India), the use of a thousand imperial gallons of water for rice cultivation yields a gross agricultural income of 0.25 rupees or US\$ 0.05. This income has to pay not only for the water used, but also for the use of the land, labour, etc. This example demonstrates that water costs for irrigated farming must be very low in order to allow a minimum return. In one way or another, agriculture in developing countries is based on very low-cost water; high-value agriculture, which might afford somewhat higher water costs, is comparatively rare. Thus, for instance, in most developing countries, dairy farming and vegetable growing are limited, and plantations and horticulture are found in only a few.

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Not all of the low-cost surface water resources have been developed as yet. Indeed, in some of the sparsely populated developing countries, only a fraction of the available low-cost surface water is presently being used. Thus, the United Nations has found that, in the Manabí Province of Ecuador, a dam on the Portoviejo River will provide water for US\$ 0.011 per 1,000 gallons; on the Jama River, for US\$ 0.012 to US\$ 0.028 per 1,000 gallons; and on the Calceta River, for US\$ 0.03 per 1,000 gallons. All these figures include the cost of conveying the water by gravity flow to the fields. Thus, the present water shortage in this area can be alleviated through the development of conventional water resources.

The majority of developing countries have, however, developed the bulk of their low-cost surface water resources. Further surface water development often involves heavier investment per unit capacity and longer distance water transportation. This trend, manifest in countries such as Ceylon and India, is so evident that a detailed account is unnecessary.

In semi-arid and arid countries where water shortages are an historical fact, the population has adapted itself to water conditions either by nomadic cattle raising, by using any available water, even brackish water, for drinking or, very often, by reducing water requirements to a minimum. However, in those semi-arid and arid countries where elements of a modern economy have developed, resulting in an increase in the purchasing power of the water consumer, much higher water costs prevail. The United Nations survey of water-short areas in developing countries [see page 118] has shown that mining, including petroleum enterprises; modern industries; ports, including fishing ports; and tourist centers can afford, if necessary, much higher water costs than can agriculture in developing countries.

Where governments have begun to provide uncontaminated water to the urban or rural population in semi-arid and arid areas, it has been found that, in many such countries, water has to be priced in a way which corresponds to the limited purchasing power of the population. For example, Tunisia has a uniform maximum price for water of about US\$ 0.35 per 1,000 gallons, and in some other countries, even lower prices prevail. In situations where the cost of obtaining water may be higher, governments often have no alternative but to subsidize water prices. This procedure, as long as the quantities involved are small, may be feasible, but it is likely to create difficult financial problems when the quantities involved become large. There is, therefore, a greater impetus and necessity in developing countries than in industrial countries to obtain and develop low-cost water, at least in so far as residential needs are concerned.

Cost of Groundwater

In those semi-arid and arid areas of developing countries where water needs are, at present, most noticeable and where practically all known desalination plants are located, groundwater usually is the predominant alternative source of water supply; so it is with groundwater costs that desalination costs will usually have to be compared.

The average costs of groundwater range from US\$ 0.01 to US\$ 0.10 per 1,000 gallons, as the following few examples will illustrate.

In Chile, an official study found that the cost per 1,000 gallons of water ranged from less than US\$ 0.01 for a well with a capacity of 1,585 gallons per minute and only 66 feet deep to US\$ 0.08 per 1,000 gallons for a well with a capacity of only 79 gallons per minute and 328 feet deep.

In Taiwan, a project provides for the construction of 250 wells, 200 to 500 feet deep, yielding 500 to 2,000 gallons per minute. The average cost for water from the well field is US\$ 0.02 per 1,000 gallons.

Groundwater costs are also similar in California. A study shows that a well with a capacity of 300 gallons per minute will produce water at US\$ 0.027 per 1,000 gallons if pumped from 150 feet whereas, if pumped from 350 feet, the water will cost US\$ 0.059. If the capacity of the well is 1,200 gallons per minute, costs for 150 feet of pumping will amount to only US\$ 0.017 per 1,000 gallons and for 350 feet, to US\$ 0.035 per 1,000 gallons.

In 1964, a United Nations team of experts studied the applicability of desalination in comparison to the availability and costs of conventional water supplies in Madras, India. They found that, under the specific conditions of Madras, the total investment needed for a well about 150 feet deep and capable of supplying one million gallons per day was 40,000 rupees or about US\$ 8,000. The corresponding investment in a desalination plant with the same capacity would amount to more than US\$ 1,000,000. If water costs are calculated for a well field yielding 30 million gallons per day, then the total investment would amount to 9.7 million rupees, including 8 million rupees for a 10-mile, 36-inch pipeline to the city. Taking 9.7 percent for total fixed charges (4.5 percent interest, 3.2 percent amortization, and 2 percent maintenance and operation), the cost of groundwater delivered to the city would amount to 0.12 rupees per 1,000 gallons or US\$ 0.024.

In the event that the groundwater fields near the city of Madras should not be able to supply all the needed water, calculations were

made for the cost of developing a groundwater field in the Neyveli area, about 123 miles from Madras. The groundwater delivered to the city of Madras, in this case, would amount to 0.95 rupees per 1,000 gallons or US\$ 0.19. The major cost of such water is, of course, its transport.

Groundwater vs. Desalination

As stated above, normally, desalinated water will have to compete first and foremost with groundwater and, usually, groundwater is much cheaper than desalinated water. However, long-distance pipeline conveyance of groundwater (transport by open channels normally being unfeasible) rapidly raises groundwater costs. Whenever the location of a water need is close to a saline body of water and groundwater fields are far away, desalination may prove to be the lower cost of supply, especially if the total quantity of water needed is small.

The attraction of groundwater development for developing countries lies not only in its comparatively low cost but, even more so, in its comparatively low capital requirement. Moreover, no lumpy and large-scale capital investments are necessary, since new wells and well fields can be developed as the water needs expand. A desalination plant, however, requires a very large and lumpy investment. If one defines a developing country as a country which is short of capital and where there are many demands for the available capital, one will come to the conclusion that the high capital costs for desalination are indeed an obstacle to its wider and quicker application in developing countries.

This short survey of water supplied by rivers or from groundwater fields reflects costs for water which is available near the location of water needs. However, water needs rise steadily, and new water needs may exceed the capacity of available water resources. Therefore, on a long-term basis, as new and more costly water resources will have to be developed, water costs in developing countries are bound to rise, especially if long-distance transport of water becomes necessary.

The conclusions to be drawn from the short preceding exposé on water costs in developing countries are as follows:

- a) The bulk of all water consumed in developing countries is used for irrigated agriculture, which can afford water only at very low cost;
- b) non-agricultural sectors of an economy can afford higher water costs;
- c) the low purchasing power of the population requires comparatively low water prices, especially for domestic purposes;

d) normally, groundwater is very much cheaper than desalinated water;

e) new and additional conventional water supplies may cost more than the cost of existing water supplies.

Possible Economic Uses for Desalinated Water

Applying the above conclusions to the subject matter of this Symposium — the potential application of desalination — one might, as regards developing countries, first rule out two misconceptions which have recently appeared in print. It is idle to expect that desalination may become cheap enough to use it for the cultivation of staple crops such as rice or wheat in developing countries. Such a proposal, recently made by a group of scientists, disregards reality and raises hopes which cannot be fulfilled. Secondly, as the United Nations survey has shown, there appears, at the moment, to be very little chance for large-scale desalination of plant units of 50, 100, or 150 million gallons per day, because, where water is short, such as in arid areas, the population is small, too, and often dispersed; and the industrial, mining, and tourist demands are small in quantity. There may be one or two exceptions to this rule in cases where a country has a concentrated demand and a water grid system, but such cases will remain exceptions for the time being.

A further conclusion to be drawn from the preceding text is that water needs of an area must be regarded in toto and so must its water resources. Desalination can never be recommended unless it is the result of a comparative cost study, comparing it to the cost of alternative sources of supplies and, where possible, providing for blending and mixing of desalinated water with conventional and/or brackish water so that the supply of costly desalinated water alone can, wherever possible, be avoided. Blending and mixing of desalinated water with brackish and/or fresh water is already widely practiced and will probably provide, quantitatively, the major application of desalination. Such blending and mixing can have three major purposes: (a) to improve the quality of water; and/or (b) to increase the quantity of water; and (c) to reduce the cost of water. Recently, United Nations teams of experts have proposed the blending of desalinated water with brackish water in Southern Tunisia and in the Persian Gulf area of Saudi Arabia with a view to increasing the quantity and improving the quality of drinking water without unduly increasing the cost of the water-mix.

Reclaimed sewage water or groundwater in a closed basin which, by frequent use, shows an increasing salinity may have its quality restored by the addition of desalinated water so that it can be reused for its original purpose.

Desalinated water, if used for mixing and blending, may produce a water-mix cheap enough not only for residential use in developing countries, but also for drinking water for cattle and perhaps, in the future, for the improvement of the quality of water used to irrigate high-value crops.

One important factor which may contribute to a quicker utilization of desalination in developing countries has not yet been mentioned, namely, the reluctance of governments to permit diversion of low-cost water used in agriculture to non-agricultural purposes. From a purely economic point of view, it is undoubtedly true that a diversion of low-cost water, yielding a very low income in its use in agriculture, to non-agricultural purposes may not only yield higher income than in agriculture, but may also avoid the necessity of new investments in water supply facilities which, under the prohibition of diversion, would become necessary. Nevertheless, governments in developing countries are reluctant to do this because they must maintain a minimum food production in order to feed their people. In addition, most governments fear the social problems which may arise from a rapid displacement of the farming population through the purchase of their water for a non-agricultural use. Therefore, it is a reasonable assumption that, in most developing countries, the large quantities of low-cost water, whether used efficiently or not, will remain restricted to agricultural use, and that urban centers, industries, and other branches of the economy may have to base their main water supply on an, as yet, unused conventional source of water, usually groundwater, and sooner or later may have to add desalination when existing quantities of conventional water become insufficient.

If, in the future, governments continue to restrict the transfer of water used in agriculture to non-agricultural purposes, then a further reasonable assumption is that the demand for desalinated water will not only continue to grow in semi-arid or arid areas, but will also arise in areas of intensive irrigation where conventional water resources are largely developed. This will apply first to densely populated, food-importing countries, as well as to all other developing countries which are making full use of their conventional water resources.

Surveying Costs of Supplying Fresh Water

In surveying potentially available conventional water resources, it is often found that the availability of groundwater has not even been considered, far less studied or properly explored. Frequently, also, available brackish groundwater resources are neglected. By blending and mixing desalinated water with conventional fresh water or brackish water, the cost of the final water-mix can often be reduced to a level which is financially and qualitatively acceptable to the government and to ultimate water consumers. Application of desalination in developing

countries has, therefore, to be seen within the framework of their total water resources, standard of living, and economic development potential.

A very recent example of the United Nations approach to desalination can be found in the proposal of a United Nations mission (which included a water economist, a hydro-geologist, a surface water specialist, and a desalination expert) which has studied the applicability of desalination in the coastal region of the Eastern Desert (Red Sea area) in the United Arab Republic. The mission has proposed a project which will (a) review the present and future water needs and supplies of the area, (b) undertake hydro-geological surveys to determine the availability of fresh or brackish groundwater and, (c) on the basis of such data, determine the size and location of future desalination plants, if needed. Parallel to the hydro-geological exploration, a study on the cost of transporting Nile water and groundwater, if available, by pipeline to areas of water need will be carried out. Once the data on costing and availability of fresh and brackish water as sources of water supply or for purposes of blending are available, the most economic solution will be determined. In this water-short area, it is likely that, for a number of localities, desalination will prove to be the most economic solution, especially if the cost of the desalinated water can be reduced by blending. The major objective of all these studies is to produce a master water development plan for the area as a whole, in which the most economic solution for each locality will be given, indicating whether desalinated or conventional water would be a supplementary, major, or sole source of water.

The United Nations has recently published proposals for a costing procedure for water desalination. [See page 118] designed to (a) provide a framework for a sound economic comparison between the cost of conventional and desalinated water, (b) provide for a sound costing of water and power in a dual-purpose plant, and (c) provide for an economic comparison among types and sizes of different desalination projects. Although governments may sometimes, for political or social reasons, decide on water projects overriding economic considerations, they are nevertheless eager to know the true economic costs of alternative projects. With the advent of desalination, conventional water supply projects should now be fully costed because, otherwise, no economic comparison is feasible.

The sound costing of water and power in a dual-purpose plant proposed in the above-mentioned United Nations study has so far not been fully accepted by some of the proponents of dual-purpose plants. But, just as the United Nations, in its studies and advice, has not recommended a costing procedure for river basin development whereby hydro-power subsidizes partly or totally the cost of the water, similarly, the United Nations cannot recommend a costing procedure

whereby, in a dual-purpose desalination plant, power will subsidize the cost of the desalinated water. Correct economic costing, from the viewpoint of the United Nations, is also applicable to dual-purpose desalination plants.

Finally, the costing procedure will allow an economic choice among the various types and sizes of desalination plants. The calculations will also take into consideration the costing of storage capacity, always required in individual desalination plants, that is, in those locations where one desalination plant is the only source of water. Such costing of necessary storage is frequently overlooked.

COSTS AND COSTING PROCEDURES IN DESALINATION

John J. C. Bradbury

[From a paper presented at the
Inter-regional Seminar on the Economic
Application of Water Desalination,
22 September - 2 October 1965, United
Nations, New York.]

These are
excerpts
from the
paper.

It has become apparent during the course of the last few years that a tremendous pressure is being exerted on the water resources of many developing countries, particularly those located in arid or semi-arid regions. In many of these areas, further economic progress will not be possible until adequate additional supplies of water become available and, in some instances, failure to provide this additional water may well result in standards of living being reduced below present levels.

This great need to reinforce existing natural water supplies forms the largest problem facing administrators and policy makers in many developing countries. Fundamentally, the solution to this problem is concerned with the basic economic proposition of making the best possible use of scarce resources which have alternative uses. In these circumstances, the chief concern of those responsible for taking the necessary decisions in this field should be that their deliberations be based upon proper economic criteria after careful consideration of the costs associated with various alternatives. The only way in which a realistic choice can be made concerning alternative

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sources of water supply is to evaluate them by means of a realistic cost appraisal applied to all on a consistent basis.

It will be appreciated, therefore, that any policy maker charged with deciding between alternative possible water sources should have available to him an adequate costing procedure as a fundamental to his consideration of the problem.

The first advantage accruing from the use of a proper costing procedure is that it will assist in deciding whether desalination itself is a proper solution to the problem of water sources when compared on a consistent basis with other alternatives such as well fields and the long-distance bulk transportation of water which may be available within the particular area.

The second main advantage of proper costing in desalination arises from its use in rate-setting. In many countries of the world, it is considered socially desirable for the government to set water rates at a level which will not penalize the poorer sections of the community and which, therefore, involve a measure of subsidy in so far as the true cost of production is not recovered from consumers. Obviously, it is essential to know the actual cost of water before the proper amount of subsidy can be calculated. There are cases of governments giving water subsidies which they do not intend because their existing costing procedures are so inadequate that the proper costs of producing water are not brought to light and are not covered adequately by revenue from water sales.

Thirdly, having decided on desalination as the proper source of future increments of water production, it is then necessary to specify which type of desalination system is the most suitable, having regard to the conditions peculiar to the proposed location. Physical and technical considerations will have a profound influence in deciding the basic type of plant to be installed. For example, raw water salinity may influence the choice as between evaporation and electrodialysis, since high salinity water, whilst suitable for evaporators, cannot be used economically by electrodialysis plants, which require a brackish intake. However, the final design parameters of the chosen system can only be established after considering the estimated costs of production, allowing for all local conditions. Manufacturers of desalination equipment are always prepared to supply estimated operating costs for their plants, but the discerning administrator will be anxious to benefit from the experience of others who already possess a similar type of plant and can be expected to know the detailed costs of operation. Unfortunately, the multiplicity of different costing procedures which now exist at various desalination sites throughout the world prevents any useful comparisons' being made in many instances.

Factors Affecting Variations in Water Costs

Differences in water costs throughout the world do not depend exclusively on different approaches to accounting procedures and the financial principles involved. Other considerations can affect unit costs of production and further extend the difficulties associated with trying to make realistic cost comparisons between different sites. These aspects can be considered under various headings, the most important of which concern the various technical factors associated with desalination projects.

Type. The basic type of plant installed will have a significant impact upon overall production costs, and plants will need to be segregated into flash-evaporation, vapour-compression, electrodialysis, freezing, and solvent extraction types before any useful comparisons can be made. Each of these processes has its own distinctive characteristics which, in turn, affect the cost of operation. Thus, the total investment for a vapour-compression desalination plant appears to be approximately US\$ 260 per cubic metre of daily capacity, whilst multi-flash evaporators have comparable figures in the range of \$350 to \$500. The freezing system suffers from the disadvantage of having investment costs per unit of output capacity higher than those applicable to the vapour-compression or multi-flash systems. Total investment for an electrodialysis plant is as low as \$125 per cubic metre of capacity, but the attraction of this is outweighed by other operational inconveniences.

Design. Apart from the basic principle of operation, costs can be affected by variations in design applicable to individual installations. Thus, the plant installed in the Virgin Islands uses 11 kWh of electricity per cubic metre of output. This is in sharp contrast with the Nassau installation where electricity consumption is only 1.1 kWh per cubic metre. The reason for this wide divergence is that, in the Virgin Islands, the yield ratio of seawater to fresh water is high and that this involves a high requirement for water pumping. The figure given for Nassau does not necessarily imply that this plant is particularly economic in water pumping requirements since, for local reasons of power station convenience, it was decided to operate the main seawater feed pumps by means of steam turbines. This example will illustrate the fallacy of drawing conclusions from installations which are not comparable.

Power. The cost of electricity used for auxiliary power is a significant item in desalination costs, particularly in flash evaporators where considerable quantities of water are pumped by electricity. If the desalination plant is installed in an area having a large, interconnected electricity supply system, then the economies of scale arising from the electricity system will be reflected in the basic price of

electricity used for auxiliary power. If, however, the desalination plant is situated in a remote area with only a small electricity supply system, or if the auxiliary power requirements have to be generated at a desalination site, then the cost of electricity will tend to be high.

The method of providing heat to a desalination process can also have a significant effect upon operating costs as between different locations. For example, where separate boilers are installed to provide steam solely for the use of a flash evaporator, the cost of supplying this heat will differ from that applicable to another location where heat is provided from a dual-purpose electricity-generation and water-production installation. The cost of desalinated water produced in this latter case will be further complicated by the method used for the allocation of joint costs between electricity and water production.

Geography. The question of heat cost illustrates the important effect of geographical influences on the costs of operating desalination plants. Clearly, any plant situated near an abundance of cheap and easily accessible fuel will have a cost advantage when compared with an installation remote from such benefits. Reference has already been made to the way in which the cost of electricity may vary from site to site and this is, to a certain extent, a reflection of the cost of the available fuel. Thus, it is possible for a desalination project to receive the benefit of cheap fuel through the availability of low-cost electricity for auxiliaries as well as in the form of cheap primary heat. Fuel cost varies considerably at desalination locations throughout the world. For example, at Eilat in Israel, fuel oil costs US\$ 17 per ton, whilst at Kuwait, heat for desalination is obtainable free in the form of natural gas. In Malta and Nassau, oil costs \$14 and \$12.80 per ton, respectively, whilst at Qatar the cost is only \$2.40 per ton.

Amongst geographical influences must also be included the impact of local geology on the question of foundations with consequent effects on the cost of construction. Under the heading of geography can also be considered the standard of local workmanship and productivity of labour available to maintain and operate a desalination plant. These may be so bad as to require a considerable expenditure for training or else the maintenance of excess staff.

Differences in Accounting Methods

Quite apart from the various physical and tangible differences in desalination plants which affect costs from area to area throughout the world, variations can also arise due to the differences in accountancy treatment given to the basic information. The most important item under this heading concerns capital charges, particularly depreciation which varies from location to location depending upon what asset life is

assumed. A further difficulty in assessing the impact of capital charges as between various plants arises from the age of individual installations. Thus, with continued inflation, plants installed ten years ago would have lower investment costs than modern plants and if depreciation is carried on an historical basis, the older plants will tend to have a cost advantage except in so far as this has been nullified by advances in technology.

In view of the considerable investment usually associated with desalination projects, the question of interest rates is of great importance in assessing the overall cost of the resulting product. It is, however, evident from the figures contained in the United Nations survey [see page 118] that, at some locations, the interest rate used in computing water costs is hypothetical and does not reflect the true local cost of obtaining money.

Whilst there are many causes of differences in costs as between desalination plants in different parts of the world, it will be seen that some of these differences arise from the great diversity in approaches which are at present made in the accounting principles involved. In order to obviate the differences arising from this cause, the United Nations has published during 1965 its proposals for a costing procedure for application to water desalination projects. [see page 118] It is hoped that the application of this procedure will result in a greater measure of uniformity and enable comparisons between water supply sources to be carried out on a much more comparable basis.

Adapting to Local Conditions

Whilst the basic principles of desalination technology must apply all over the world, it is possible to vary individual designs to make allowance for the particular economic conditions applying at particular sites. In view of the comparatively large investment usually associated with these installations, the rate of interest assumes great importance in the economics of operation. In a country having a high rate of interest but a relatively low cost of fuel, it might be economically advantageous to save capital by reducing evaporator-gain ratio. This would increase the plant's consumption of heat and lower the thermal efficiency but, with an abundance of cheap fuel, this may be considered an acceptable method of saving scarce capital. It is possible to envisage the opposite set of circumstances where a country having an abundance of cheap capital but high fuel costs builds evaporators with high gain ratios and high fuel economies at the expense of incurring additional capital expenditure.

The prevailing interest rate will also have a profound effect on the extent to which building capacity ahead of demand can be contemplated when a plant is constructed. In the case of a dual-purpose desalination

installation, the degree of permissible prebuilding will also depend upon other technical factors. The most salient technical consideration arises from the fact that the outputs of water and electricity in a dual-purpose plant are in a fixed proportion. It is, for example, not possible to increase the output of water without there being a demand for electricity available at the right level. Thus, if 5,000 cubic metres of water per day can be obtained from a base electrical load of 6,000 kW, 10,000 cubic metres per day will not be available until the electricity base load has risen to 12,000 kW. It is, therefore, clear that a decision to carry out prebuilding cannot rest on economic considerations alone but must be made after a careful analysis of the separate growth rates of demand for water and electricity, to ensure that both are compatible with the outputs proposed for the additional installation.

Nuclear Power and Desalination

Much attention is being given at present to the possibility of combining desalination plants with nuclear-fired power stations, and economic advantages are being claimed for this combination. In the present state of technology, nuclear-fired boilers are limited to comparatively low steam conditions compared with those being attained in advanced designs of conventionally fired plants. These conditions result in low turbine efficiencies. Consequently, a relatively greater amount of heat is wasted in a nuclear-powered turbo-generator than in a conventional machine of comparable electrical output. This greater availability of waste heat means that, all else being equal, more waste heat per unit of electrical output can be obtained from a distillation plant associated with a nuclear power station than from a fossil-fuel fired generating plant. In these circumstances, it may be possible for the addition of a water desalination plant to lower the costs of nuclear power generation sufficiently to justify the construction of a nuclear power station.

The combination of desalination and nuclear power plants is not, however, without its disadvantages. The chief of these disadvantages is that the desalination installation located adjacent to the nuclear station must suffer from the isolation which may be imposed by an exclusion area. This, in turn, will have an adverse effect on water costs by increasing the transmission expenses associated with the provision of longer pipelines and increased pumping requirements.

The operating and maintenance staff requirements for a dual-purpose nuclear and water installation will be particularly exacting in view of the present specialized nature of nuclear technology. There are probably few countries whose level of technical education would allow a nuclear installation to be staffed by local technicians. The importation of foreign staff, particularly in developing countries, could entail high supervisory costs.

The foregoing has attempted to illustrate the many differences in production costs found at desalination sites throughout the world and to give some reasons as to why these exist at present. There is no doubt that the adoption by all desalination users of a standard costing procedure as recommended by the United Nations would make results somewhat more comparable. Although local costs for the purpose of comparison can be expressed in terms of dollars, differences in the purchasing power of each currency will tend to nullify accurate comparisons. Despite this limitation, it is hoped that more attention given to the aspect of desalination costing will result in policy decisions concerning water supply sources being based, in future, on more substantial economic foundations than have been used in some instances in the past.

RECENT SOURCES OF INFORMATION ON WATER DESALINATION

United Nations Inter-regional Seminar on the Economic Application of Water Desalination, New York, 22 September - 2 October 1965.

The papers from this Seminar are particularly useful. They provide reliable treatment of most aspects of desalination, 1) at a technical level that can be understood by planners and not by desalination technicians only, and 2) in the context of the total water-resources problem, which planners must face. The Seminar was held to brief representative planners from 35 less developed countries with aridity problems and to permit them to discuss the issues with world experts.

Results of the Seminar will be summarized in a report to the Economic and Social Council, and Proceedings will be issued as a United Nations document. The following papers were presented:

"Water Desalination — Present Application and Outlook for the Future" by Joseph BARNEA (UN)

"Costs and Costing Procedures in Desalination" by John BRADBURY (Bahamas Electricity Corporation)

. See excerpts above, pp. 109-115.

"The Utilization of By-Products and Related Effects on the Cost of Desalinated Water" by W. F. MC ILHENNY and P. E. MUEHLBERG (Dow Chemical Corporation, Texas)

. Conclude that importance of chemical by-products recovered from desalination process should be quite modest.

"The Application of Dual-Purpose Power and Water Desalination Plants" by S. BARON (Burns & Roe, New York)

. Mechanics and cost in dual-purpose plants.

"The Pricing of Water, With Special Reference to Desalinated Water" by Joseph BARNEA

. As water costs rise, it becomes more important for planners to know whether or how much water rate structures subsidize consumers, including farmers who irrigate.

"Evaluation and Selection of Water Resources — Surface Water"
by Hugh MAC DOUGALL (UN)

"Evaluation and Selection of Water Resources — Ground Water"
by James GERAGHTY (UN)

"Distillation: Present Technology and Related Problems" by
R. S. SILVER (Heriot-Watt College, Scotland)

"Electrodialysis: Present Technology and Related Problems" by
R. MATZ (Negev Institute for Arid Zone Research, Israel)

"Freezing Process: Present Technology and Related Problems"
by Walter RINNE (Office of Saline Water, USA)

"Other Desalination Processes — Reverse Osmosis, Hydrates,
Ion Exchange" by Joseph STROBEL (Office of Saline Water, USA)

"Desalination Plant as a Sole Source of Water; Selection of Size
and Type of Desalination Plant" by John BRADBURY

"Desalination and Energy" by Gilbert COSTES (SOCETEC,
France)

. Physical energy requirements and actual requirements
(ca. 30-40 percent of cost) in different processes.

"Applications of Nuclear Energy to Water Desalination" by Rurik
KRYMM (International Atomic Energy Agency)

"Economics of Conveyance of Water" by Karl-Erik HANSSON (UN)

"Analysis of Water Demand" by Enzo FANO (UN)

"Corrosion Control and Materials Improvement" by M. N. FOKIN
(Academy of Sciences, USSR)

"Relationship Between Storage Capacity and Load Factor of a De-
salination Plant" by Alfred GOLZE (Department of Water
Resources, State of California)

"The Desalting Plant as a Component Within a Water Supply Sys-
tem" by A. WIENER (TAHAL-Water Planning for Israel)

"Desalination as a Sole Source of Water" by Hans BECK (WEB
Balashi, Netherlands Antilles)

Other papers reported on research and experience in operating
desalination plants in Bermuda, Hong Kong, Kuwait, Israel,
Malta, Poland, the United States, and the US Virgin Islands.

* * * *

Water Desalination in the Developing Countries, New York, United Nations, 1964, US\$ 4.00, 325 pp., ST/ECA/82, Sales No.: 64. II. B. 5.

A study undertaken by the United Nations in 1962 and financed by the Ford Foundation 1) sought to identify water-short areas with economic growth potential in the less developed countries which appear to present possibilities for the economic use of desalted water, and 2) collected economic and technical data on desalination plants operating there in the end of 1962. The book includes valuable comparative tables on production cost and consumer prices of water from desalination and from conventional sources. Cost data, when related to the different kinds of plants in use in the various countries, are particularly interesting. There are discussions of the water situation in 43 countries and territories, of possible technological breakthroughs, and approximate cost estimates for different types of plants of different capacities.

The book brought to light a lack of knowledge about water resources in general, which usually makes rational choice between use of conventional or desalted water sources impossible.

* * * *

Water Desalination: Proposals for a Costing Procedure and Related Technical and Economic Considerations, New York, United Nations, 1965, US\$ 0.75, 56 pp., ST/ECA/86, Sales No.: 65. II. B. 5.

Another problem area highlighted by Water Desalination in the Developing Countries was the lack of agreement on accounting procedures for arriving at the cost of desalinating water. If a government subsidizes construction of a desalination plant by financing it with low-interest loans, should account be taken of the subsidized cost to the plant or of the higher imputed cost to the society of having its scarce capital tied up in this venture? When a desalting plant also provides electric power, how are costs to be divided between the two outputs?

The United Nations studied these and similar problems. Its Proposals for a Costing Procedure are intended to establish a norm that will make international, and local, comparisons simpler in the future.

* * * *

First International Symposium on Water Desalination, Washington, 3-9 October 1965.

Readers willing and able to deal with highly complex and specialized aspects of desalination should see the 125 papers on technical

problems of desalination and plant operation presented at this meeting of specialists from all over the world. The proceedings of the Symposium will be available from the United States Government Printing Office by mid-1966, and inquiries about the meeting may be addressed to the Office of Saline Water, US Department of the Interior.

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Saline Water Conversion Report for 1964 [annual series], United States Department of the Interior, Office of Saline Water, 1965, US\$ 2.00, 279 pp.

Specialists may also want to consult these annual reports, which summarize the results of research in the United States and elsewhere.

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Desalination of Water Using Conventional and Nuclear Energy, Technical Reports Series No. 24, Vienna, International Atomic Energy Agency, 1964, US\$ 1.00, 56 pp.

This pamphlet provides an introduction to some technical questions for non-specialists. Description and diagrams explaining how different desalination processes work may interest planners not already acquainted with these processes.

* * * *

"The Supply of Fresh Water to Southern Tunisia; Study of Available Resources of Water from Conventional Sources Improved by Desalination," New York, United Nations, 19 March 1965, TAO/TUN/4.

This report is interesting for two reasons. Firstly, it illustrates the kind of work the United Nations is doing to help less developed countries with their water resource problems. Secondly, it illustrates the importance of considering all possible solutions. Southern Tunisia has been considered a logical location for a large, atomic-powered, desalination plant. A recent International Atomic Energy Agency study showed this solution to be feasible. However, the UN mission team discovered a much cheaper solution — mixing local brackish water with water from a small desalination plant which would use the steam from a nearby sulfuric acid plant.

SOME RECENT BOOKS

THREE BOOKS ON INDUSTRY

Staley, Eugene and Richard Morse, Modern Small Industry for Developing Countries, New York, McGraw-Hill, 1965, US\$ 9.00, 435 pp.

"There has probably been more sentimental nonsense written and talked about small industry as a key to industrial development than about any other aspect of the subject. . . . If confused by sentimentalism and approached with little regard for the costs and benefits involved, small industry development can easily become a missionary movement which accomplishes little but which diverts scarce resources of development funds and people away from other activities which. . . could produce much more industrial growth." These are the words of Murray Bryce in the book reviewed below, but Staley and Morse surely agree with them. The difficulties of their chosen field are compounded by the countervailing bias, partially shared by Bryce, that only large-scale industry can be modern and efficient.

Modern Small Industry for Developing Countries is a comprehensive, balanced, and extremely useful treatment of a controversial subject. It benefits from its authors' association with the Stanford Research Institute, which has a long history of work on small industries in developing countries. The authors are neither "for" nor "against" small industry, believing that modernized small industry has a place in developing economies, just as it has a substantial place in the world's most industrially advanced countries. They identify 1) its characteristics, 2) the areas of production in which it is apt to excel, and 3) policy measures to stimulate transformation into or creation of efficient small units. The book is full

of useful examples. While pre-factory forms of industrial organization are considered, it is the small factory that presents the greatest interest for development.

A small industry is defined as one employing less than 100 people. While the share of such units in total production decreases as modernization progresses, they remain important (26 percent of employment and 21.9 percent of output in the United States) and tend to produce components for or to service the products of big industry. Types of industries in which modern small industry tends to predominate were found to be:

- 1) factories which process a dispersed raw material, e.g., milk product processors, lumber and sawmill operations;
- 2) products with local markets and high transfer costs, e.g., soft drinks, ice, cement, brick, mattresses;
- 3) service industries, e.g., printing;
- 4) separable manufacturing operations, e.g., machine shops, pattern-making, casting;
- 5) crafts, e.g., jewelry;
- 6) simple assembly, mixing or finishing, e.g., finishing furniture, food flavoring, insecticides;
- 7) differentiated products with low economies of scale, e.g., women's clothing;
- 8) industries with small markets, e.g., leather goods, pottery products, spaghetti, buttons, artificial flowers.

Staley and Morse study the advantages of small firms in these fields and their complementarity with big industry. They conclude that small industry may be useful in creating jobs where there is surplus labor, but that it probably cannot achieve the goals of industrial development with less capital expenditure than big units can.

Having established the areas in which small industry may be useful as development proceeds, the authors turn to government policies to stimulate it or to encourage inefficient units to modernize. They find that the most important stimuli have been economic growth itself; confidence in government; laws and regulations which encourage modernization, availability of transportation, power, communication, and water; and a policy of manpower training. Experience nearly everywhere suggests that private enterprise is "more flexible, efficient, and better-adapted for management of small factories" than either government or cooperative management. Negative attitudes toward profit which characterize traditional societies are no help. The authors further recommend government policies of fostering industrial estates, buying from small as well as large producers, training managers, making loans on favorable terms to innovators, and assisting in marketing and in labor relations.

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Bryce, Murray D., Policies and Methods for Industrial Development, New York, McGraw-Hill, 1965, US\$ 7.50, 309 pp.

Much has been written on the controversial field of promoting industrial development, but it has not settled the many controversies. This book will not end them either, but it has value both because it is designed to be of practical use to those actively concerned with industrial development policy, and because it attempts to synthesize existing literature and experience in the field. The author, who has assisted many countries in industrial development, is now trying to put his ideas into practice as manager of a company which promotes joint industrial ventures in less developed countries.

Industrial planners will probably want to skim through Part 1, on much-discussed general issues related to industrialization, to concentrate on Part 2, which describes the kinds of help industry needs, and on Part 3, which deals with the kinds of incentives — tax, tariff, and other — that can stimulate industry. The author is pessimistic about possibilities for efficient government management of industry in less developed countries. In any case, the author believes foreign enterprise will be needed and should be encouraged where "the country is ready politically and mentally to create conditions which will make it possible to use foreigners without being abused by them."

Appendices furnish information on labor, energy, and electricity intensity of industries in the United States and hints on tapping the U.S. market. One wonders about the usefulness of information on Puerto Rico's exports to the United States for other countries that must face tariffs.

This book does not cover industrial project formulation and evaluation, which were dealt with in Bryce's Industrial Development: A Guide for Accelerated Economic Growth (McGraw-Hill, 1960).

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Solomon, Morris J., Better Plant Utilization in India — A Blueprint for Action, Bombay, Asia Publishing House, 1963, US\$ 5.50, 59 pp.

In most less developed countries, as in India, machinery is scarce and expensive both because the skill of manufacturing it is not sufficiently established in the country and because overvalued foreign exchange rates make it difficult for industrialists to import it. Under these circumstances, where labor is relatively more plentiful, the author points out, it is definitely profitable to take extraordinary steps to make sure that machines are used up to capacity.

The author, an American statistician who worked with the Indian Statistical Institute from 1959 to 1961, proposes numerous "machine-saving" techniques which would seem strange in a fully industrialized country, but which should be normal in a country with India's factor mix. He proposes using multiple shifts, staggered lunch periods, "double-teaming" of machines, and longer rest periods for workers to speed up their pace, thereby reducing machine time wasted through absenteeism, rest breaks, etc. The evidence presented indicates that production and profits can be substantially increased in this way. Suggestions are made for appropriate government policies which would induce such improved plant use.

FOUR BOOKS ON FINANCIAL ASPECTS OF DEVELOPMENT

Hicks, Ursula K., Development Finance: Planning and Control, New York and Oxford, Oxford University Press, 1965, US\$ 3.50, 187 pp.

In writing this concise book, the author — a veteran writer and adviser on development — aimed at a practical, simple, and systematic treatment of the basic principles of budget control, choice of expenditures, and monetary and fiscal measures. The book is comprehensive; in fact, since the financial aspects are so important to development and so central to planning, it could serve as an introduction to the entire subject.

The author concentrates on the broad choices that must be faced, not permitting them to be obscured by details related to projects or to particular conditions, nor proposing simple and universal answers to them except where such answers seem justified by experience. Whether she discusses factors affecting choice of investments in the educational sector or the role which central banks do and ought to play in development, she seems to have isolated the crucial issues. The book does not contribute new material in the field of development, but it puts the issues into the kind of perspective that people involved in the daily tasks of development can easily lose.

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Problems of Tax Administration in Latin America; Papers and Proceedings of a Conference Held in Buenos Aires, Argentina, October 1961, Baltimore, The Johns Hopkins Press, 1965, US\$ 10.00, 574 pp.

Fiscal Policy for Economic Growth in Latin America; Papers and Proceedings of a Conference Held in

Santiago, Chile, December 1962, Baltimore, The Johns Hopkins Press, 1965, US\$ 12.00, 462 pp.

These two significant conferences were sponsored by the Joint Tax Program of the Organization of American States, the Inter-American Development Bank, and the United Nations Economic Commission for Latin America. A sizeable group of tax experts, most of them Latin American, attended in their personal capacities — a fact which undoubtedly contributed to the openness and vigor of the discussions. The papers, by well known experts like Urquidi, Kaldor, John Adler, Goode, de Navarrete, Prest, Wald, Due, and Oldman, and the full discussion, sometimes presented in excessive detail, comprehensively cover the issues of taxation and tax administration for development. Some of the specific subjects covered by papers in Problems of Tax Administration are: controlling tax evasion; estimating the distribution of the tax burden; statistical requirements, accounting, and management for tax administration; administration of sales, excise, and property taxes; and automatic data processing. Papers in Fiscal Policy for Economic Growth cover problems associated with every kind of taxation, plus special considerations related to common markets and public expenditure programs. A few of the points raised at the conferences do pertain uniquely to Latin America, but most problems are relevant to developing countries anywhere.

Although these conferences occurred in 1961 and 1962, the proceedings are now appearing for the first time in English. Spanish language version of both were published in 1964 by the Pan American Union.

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Tamagna, Frank, Central Banking in Latin America, Mexico, Centro de Estudios Monetarios Latinoamericanos, 1965, US\$ 5.00, 285 pp.

This is another book on Latin America which previously appeared in Spanish (in 1963) and which is of possible interest to planners elsewhere. Latin America, on balance, has a longer history of central banking and has had more persistent difficulties with inflation than other less developed areas. Central Banking in Latin America is a history of Latin American experience and a comparative study of its central banks in the context of development. The record speaks for itself, and it may well be interesting for countries with less experience in central banking.

DEVELOPMENT DIGEST

Cumulative Index

Volume III, Number 2, July 1965 through
Volume IV, Number 1, April 1966

Subject

Agriculture		Migration	
Jul. '65	69-88	Jul. '65	31-44
Oct. '65	79-105	Apr. '66	27-46
Jan. '66	109-123	Planning	
Credit		Jul. '65	1-30
Jul. '65	89-114	Oct. '65	79-105
Development, General		Jan. '66	41-62
Apr. '66	1-13	Apr. '66	14-25
Development, Self-Help		Population	
Apr. '66	73-98	Oct. '65	1-34
Education		Jan. '66	1-40
Jan. '66	41-62	Psychological Factors	
Apr. '66	27-46	Jul. '65	45-67
Growth, Balanced and Unbalanced		Jan. '66	98-107
Jan. '66	63-79	Sociological Factors	
Housing		Oct. '65	107-124
Apr. '66	47-72	Taxation	
Integration		Jan. '66	109-123
Oct. '65	35-77	Water, Desalting	
Management		Apr. '66	99-119
Jan. '66	81-107		

Author

Adler, John		Berelson, Bernard	
Jul. '65	11-18	Oct. '65	28-33
Assouline, Albert		Bhatt, V. V.	
Jan. '66	2-5	Jan. '66	66-71
Awasthi, S. P.		Bottomley, Anthony	
Apr. '66	28-35	Jul. '65	95-102
Balogh, Thomas		Bradbury, John	
Jan. '66	55-56	Apr. '66	109-115
Barnea, Joseph		Brown, Lester	
Apr. '66	101-108	Oct. '65	80-89
Belshaw, Cyril		Burns, Leland	
Oct. '65	116-124	Apr. '66	48-57
Benveniste, Guy		Cha, Youn Keun	
Jan. '66	55	Jan. '66	22-29

- Chaparro, Alvaro
Jan. '66 59-60, 61
- Choldin, Harvey
Jan. '66 17-21
- Clark, Paul
Apr. '66 92-98
- Coale, Ansley
Oct. '65 9-17
- Coombs, Philip
Jan. '66 41-48, 61-62
- Davis, Keith
Jan. '66 91-97
- Dell, Sidney
Oct. '65 36-46
- Desiderio, José
Jul. '65 109-114
- Elkan, Walter
Jul. '65 32-39
- Enke, Stephen
Oct. '65 24-27
- Falcon, Walter
Jul. '65 70-79
- Fei, John
Apr. '66 85-91
- Fuerstenthal, Achim
Jan. '66 98-107
- Gilbert, Richard
Jul. '65 19-30
- Gulick, Clarence
Apr. '66 74-75
- Hagen, Everett
Jul. '65 46-59
- Haniotis, George
Apr. '66 36-42
- Harkavy, Oscar
Oct. '65 2-8
- Henin, Roushdi
Jan. '66 6-10
- Herrera, Felipe
Oct. '65 66-70
- Hirschman, Albert
Jan. '66 63-64
- Hsieh, S. C.
Oct. '65 98-104
- Hussain, Syed
Jul. '65 80-83
- Kapur, G. P.
Jul. '65 84-88
- Keeny, Spurgeon
Jan. '66 30-36
- Khan, Akhter
Jan. '66 17-21
- Lewis, Arthur
Apr. '66 1-13, 81-84
- Lourie, Sylvain
Jan. '66 60-61
- Luján, Ruíz
Apr. '66 58-66
- Lyons, Raymond
Jan. '66 49-53
- Mathew, E. T.
Jan. '66 117-120
- Mayobre, José
Oct. '65 66-70
Jan. '66 58-59
- McClelland, David
Jul. '65 60-67
- McLoughlin, Peter
Jul. '65 40-44
- Myint, Hla
Oct. '65 107-115
- Nelson, Joan
Apr. '66 74-75
- Newman, Peter
Oct. '65 71-77
- Nurkse, Ragnar
Jan. '66 64-65
- Paauw, Douglas
Apr. '66 85-91
- Paukert, Felix
Oct. '65 18-23
- Platt, Joseph
Apr. '66 42-46
- Prebisch, Raúl
Oct. '65 66-70

Queirolo, M. A.
Jan. '66 121-123

Raman, M. V.
Jan. '66 11-16

Rostow, Walt
Oct. '65 90-97

Sanz de Santamaría, Carlos
Oct. '65 66-70

Sherif, Ahmed
Jan. '66 82-90

Sundram, J. D.
Jul. '65 103-108

Sutcliffe, Robert
Jan. '66 72-79

Thorp, Willard
Apr. '66 76-80

Wai, Tun
Jul. '65 89-94

Wald, Haskell
Jan. '66 109-116

Waterston, Albert
Apr. '66 14-25

Wilcox, Clair
Jul. '65 2-10

Wionczek, Miguel
Oct. '65 53-65

Wolfe, Marshall
Jan. '66 57-58

Woods, George
Apr. '66 73-74

Book Reviews

Brackett, James and Donald Akers. Projections of the Population of Pakistan By Age and Sex: 1965-1986; A Measure of the Potential Impact of a Family Planning Program, Jan. '66, p. 38.

Bryce, Murray. Policies and Methods for Industrial Development, Apr. '66, p. 123.

Fiscal Policy for Economic Growth in Latin America; Papers and Proceedings of a Conference Held in Santiago, Chile, December 1962, Apr. '66, p. 125.

Fromm, Gary (ed). Transport Investment and Economic Development, Jul. '65, p. 116.

Harbison, Frederick and Charles A. Myers (eds). Manpower and Education; Country Studies in Economic Development, Jul. '65, p. 119.

Haq, Mahbub ul. The Strategy of Economic Planning; A Case Study of Pakistan, Jul. '65, p. 118.

Hicks, Ursula. Development Finance: Planning and Control, Apr. '66, p. 125.

Hoover, Edgar and Mark Perlman. "Measuring the Effects of Population Control on Economic Development (Pakistan as a Case Study)," Jan. '66, p. 38.

Meier, Gerald (ed). Leading Issues in Development Economics; Selected Materials and Commentary, Jul. '65, p. 119.

Myint, Hla. The Economics of the Developing Countries, Oct. '65, p. 117.

Owen, Wilfred. Strategy for Mobility, Jul. '65, p. 115.

Problems of Tax Administration
in Latin America; Papers and
Proceedings of a Conference
Held in Buenos Aires,
Argentina, October 1961,
Apr. '66, p. 125.

Staley, Eugene and Richard Morse.
Modern Small Industry for
Developing Countries, Apr.
'66, p. 121.

Tamagna, Frank. Central Bank-
ing in Latin America, Apr.
'66, p. 126.

"The Supply of Fresh Water to
Southern Tunisia; Study of
Available Resources of Water
from Conventional Sources
Improved by Desalination,"
United Nations, Apr. '66,
p. 119.

Water Desalination in the Devel-
oping Countries, Apr. '66,
p. 118.

Water Desalination: Proposals
for a Costing Procedure and
Related Technical and Eco-
nomical Considerations, Apr.
'66, p. 118.

Waterston, Albert. Develop-
ment Planning: Lessons of
Experience, Jan. '66, p. 125.

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